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PEOPLE'S REPUBLIC OF CHINA

DOMESTIC TRADE

FOREIGN TRADE

'JINGJI YANJIU' DISCUSSES DEVELOPMENT STRATEGY

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[Article by Huang Fangyi [7806 2455 3015] of the Institute of the World Economy and Politics of the Chinese Academy of Social Sciences: "A Study of the Concept of 'Development Strategy'"]

[Text] It is quite common for differences of opinion to emerge in the process of understanding concepts when studying new subjects. This situation has also occurred in China now in the process of discussing development strategy. Consequently, it is imperative that questions about the concept of development strategy be clarified. This article is inteded as a preliminary study in this regard so as to provide a frame of reference to readers.

I. The Origin of "Development Strategy"

The word "strategy" is most frequently used in military science and political struggles. The use of this word in the field of economics and combining it with the word "development" is a new development. It seems that this term never appeared either in classic Marxist works on political economics of in traditional Western economic theory.

According to our study, the phrase "development strategy" began to be used following World War II. At that time, following the emergence of a series of newly independent developing countries, the question of economic development attained more and more importance. Under this situation, a new theory--development economics--was developing with each passing day. The target of this economic theory is the study of the economic development of the developing countries. It is often that the emergence of a new theory not only involves its basic principle and method of analysis. But also involves new concepts and terminology. In time, the use of the words "development strategy" in development economics has accompanied the emergence of a new concept and terminology.

According to our understanding, the first to use the phrase "development strategy" was American development economist A. D. Hirschman, a representative of Western development economics who advocated that various national economic departments must "develop in an unbalanced manner." In 1958, his works were published by Yale University, and this book spares no efforts in disseminating his "backward-linkage" viewpoint which suggests, first of all, the development of departments directly concerned with production and then departments concerned

with basic infrastructure. This book is entitled "Strategu of Economic Development."

The founder of the famous "Louis-fei [Lu Yi Si-fei 6424 2496 2448 6316]-Ranis" methodology in development economics, American development economist Gustav Rains also used the word "strategy" in studying economic development. For example, in the mid-1960's he used the concept of "planning strategy" in his specialized works published at that time.

American development economist I. Adelman, who stressed the importance of planned distribution in development economics, summed up her advocation of development strategy in the "strategy of Development of Economic Growth, Distribution of Incomes, and Striving for Equality." In 1975, she published her werks under the name of this strategy.

In the 1960's, a number of development economists abroad put forth such phrases as "import-replacement strategy of development," "export-replacement strategy of development" and "trade strategy of development" in summing up the industrialization of the developing countries. Consequently, the phrase "development strategy" began to be used more widely.

In addition, in the 1960's, the United Nations began to work out three 10-year "international development strategies" for the 1960's, 1970's and 1980's. As a result, the concept of the "development strategy" has become better known internationally.

But it was only a few years ago that the concept of "development strategy" began to be used in our country. At first, the phrase "development strategy" was translated into Chinese as "development tactics [Ce Lue 4595 3970]" because the word "strategy" also means "tactics" in English. But later, all translated articles tended to use "strategy."

At the end of the 1970's, some economists in our country, and particularly those studying foreign and world economics, began to use the phrase "development strategy." Since then, articles with "the development strategy of such and such a country" and other similar titles have appeared one after another.

In early 1981, the research department of the state scientific commission, the World Economic Research Institute and other bodies held discussions on development strategy and in these discussions, Yu Guangyuan and other comrades suggested that an "economic social development strategy" be studied. This suggestion drew the attention of various sectors. At present, the question of development strategy has been acknowledged as a special sector in the study of economics and is attracting more and more attention from theoretical economic workers, practical economic workers, scientists looking at the future, sociologists and even some natural science research workers. This situation shows that there is an urgent need in the development of present-day economics and in the development of both the economy and society to study the question of development strategy. Of course, our study of development strategy is of a different nature that that carried out by foreign bourgeois economists concerning both the goal of the study and the theoretical foundation and guiding ideology of the study.

II. Some Formulations of "Development Strategy"

In general, there are three formulations in the discussion of the question of our country's development strategy: 1) "Economic social development strategy"; 2) "Economic development strategy"; 3) "Development strategy."

The first is one of the more complete and accurate phrases used in our country about development strategy. It shows that the development strategy we are studying is the development strategy of the whole of society, with economic development as its center. It differs from the narrow sense of economic development strategy as well as from partial development strategy. This formulation not only stresses the economic sector, but also includes other sectors as part of the whole of society.

The second formulation refers to the economic sector and does not include the development of other social sectors. Therefore, it is lower than the first development strategy level. But the development strategy with such a level considers the development of various economic sectors as a whole and therefore it is different from the departmental development strategy within an economic sector and its level is higher than the latter.

The third formulation can be considered as an abbreviated form of the wording of the former two formulations.

Names are related with concepts. Having a clear formulation of development strategy is in the interests of making clear some differences in the understanding of concept and it is necessary in making further study.

III. Several Definitions of "Development Strategy"

Development strategy is a new term and concept and so far it has no acknowledged, complete and scientific definition and therefore its definition differs according to people's different understandings. According to the reference materials we have come across, the following are some representative views.

(1) "Economic and social development strategy is a basic measure that is to be implemented by a country to realize the goal of its own development."

(2) "So-called economic development strategy in general refers to a general and basic principle that is defined to reach the goal in the development of the economy of a country."

(3) "Economic and social development strategy represents a general principle and policy in the process of the development of a country with lower productivity in changing a backward economic and social situation into relatively advanced productivity and a relatively advanced economy and society."

(4) "The development strategy that is being studied internationally now mainly refers to the development process of the developing countries in transition from a backward economy to a modern economy; that is to say, it refers to the economic policy and principles that are to be followed during the development

period in gradually realizing the modernization of a country for the purpose of eliminating the economic and social backwardness that is caused by various reasons."

The above mentioned four different views have two aspects of differences. The first difference is concentrated in the latter part of the definition, that is, in the explanation of the word "strategy." According to our view, this "difference" is not important; it is not necessary to explain in words all the organic contents of the "strategy." Some people have summed up this aspect into "basic measure" while some others use "general principles and policy" or other explanations, but in reality, the difference is not so large. Furthermore, there are complete strategies and incomplete strategies. They are generally explained as "strategy" from the point of definition and not from the point of defining the most complete composition of strategy.

The second difference lies in the definition of the first part, that is, in the explanation of the word "development" and this difference is quite big. The first and second definitions represent one viewpoint while the third and fourth definitions represent another viewpoint. The first viewpoint basically explains the concept of "development" as a general, not a specific process. It can be used to refer to any country and it is also applicable to any period and stage; it is not restricted by a country, nor is it restrained by an era (stage). Conversely, the second viewpoint makes a specific definition of the word "development." That is to say, according to this viewpoint, the definition of "development" is confined to developing countries or within the process from being "under-developed" to being "developed" and consequently the concept of "development" is confined within a certain national limits and it also has a specific limitations of era (stage). Thus according to this view, the word "development" does not represent a general but a specific and definite process.

Seen from a semantics viewpoint, of the above mentioned two viewpoints, the first one is no doubt correct. In the dictionary of people's life, the word "development" has wide implications. People may consider the change from primitive society to slave society as a development and may also consider the change of a snack-shop into a big restaurant as a development. Thus "development" has neither definite target limits nor a particular definition of time (stage), nor any idea of appraisal. This view accords with people's custom of expressing things with words and therefore we cannot say it is inappropriate.

On the other hand, the second view has its own foundation and it has some desirable aspects. This view is basically derived from the concept of "development" in the phrase "developing countries" and from the concept of "development" from development economics. We all know that prior to the 1970's or earlier, in general, there was no such term as "developing countries" in the world but "underdeveloped countries" or "poor countries." "Developing countries" have appeared only since the 1970's. How do we explain "development?" There is an international argument in this respect. Now it is generally accepted that an important signal for the further development economics since the 1970's was an understanding of "development." A number of development economists abroad have made special explanations in this respect. They stressed the difference between "development" and "growth" and they also stressed that "development" includes the process of an overall progress in changes of the economic structure

and in the economic system. According to the view of development economics, advanced countries have already completed this process and therefore what these countries face is no longer "development" but "growth." According to our view and by proceeding from the point of studying development economics, such a view has desirable points because, by nature, it differentiates the economic and social changes that have to be completed by developing countries from the economic and social changes that have already been completed by advance countries and at the same time it clearly points out the different problems that are being faced by these two different categories of countries. In our opinion, using the definite concept of "development" from foreign development economics does not mean that advanced countries do not need development in the general sense; it just gives prominence to the definition of the nature of the process in which the developing countries have departed from under-developed situations. Thus such a definition is in the interests of understanding the feature of the development process of the developing countries. In fact, this understanding constitutes the foundation for the understanding of the "development strategy for meeting basic needs" that has been put forth over the past few years. In addition, this understanding is also in the interests of developing countries getting rid of traditional development strategies and in the interests of development economics getting rid of the orientation development of the traditional economic theory of Western countries. From the above mentioned process, in copying such names as "developing countries," "development" and "development strategy," we can see that the phrase "development strategy" was followed the specific "development" category while the word "development" here has developed from a general concept in a common sense into a special team in development economics. The phrase "development strategy" that is generally mentioned in international sphere is basically only involves developing countries. The above-mentioned third and fourth definitions are in fact trying to further explain the implications of the term, although it is another question whether these explanations are accurate or not.

IV. The Features of "Development Strategy"

Some people ask: Is not development strategy nothing other than what we referred to as development planning in the past? According to our view, development strategy in a general sense differs from development planning in a general sense. That is mainly because the former may include the latter while the latter cannot include the former; the former is inherently richer than the latter and has wider applications. From the view point of time, the former spans a fairly long historical period while the latter may have short, medium and long periods. In order to understand the concept of development strategy more clearly it is imperative to understand its characteristics which mainly include the following:

1. All-round nature. Development strategy proceeds from the macroscopic angle and it studies comprehensively the principles and policies that should be adopted toward the whole situation in the process of development. That is to say, the principles and policies must belong to the sphere of overall development. Development strategy does not refer to partial or departmental development, nor is it defined from the microscopic angle of the partial situation or departments.

2 Long time scale. The strategic goal that is defined by development strategy is the goal that is to be realized by a country over a comparatively long period. This goal fully demonstrates the assumption of those who work out the strategy and the main body that implements the strategy and consequently this strategy can only be realized through the protracted efforts of one or even several generations.

3. Stratified nature. Development strategy is not an isolated and single policy, it should be a (or a group of) policy system composed of different principles and policies. The stratified nature of such a development strategy involves a series of principles and policies of different fields, different aspects and different departments and these principles and policies are realized through the strategy. In this policy system, the principles and policies of different levels are in harmony with and rely on each other and they represent an organic entity that is set up in order under a unified deployment and around a common goal of efforts.

4. Stability. Development strategy is realized over a comparatively long period while its stratified nature involves the policies of various aspects and therefore it must be comparatively stable. Otherwise, when there is a change, all the related aspects will also be changed. If the development strategy is subject to many changes, it is difficult to achieve the anticipated results. Of course, that does not rule out the possibility of making readjustment and amendments that are necessary in the process of implementing the strategy. But the readjustment and amendment must be small in scale and quantity.

5. Practicability. Development strategy is a subject of study which is highly theoretical but in the final analysis it has to put forth policies that are practicable. The purpose of the study of all theories and concepts and the purpose of probing many levels and angles is to seek feasible measures for implementing policies. Therefore it can be said that the key in the study of development strategy is its practicability. For example, in our present study of seeking a new method for evaluating the development of the economy, it is relatively uncomplicated to take theoretical approach. The most difficult thing is to work out a feasible goal for such a new evaluation.

6. Various branches of learning. Development strategy represents a comprehensive subject of study involving many branches of learning and therefore it has the nature of a frontier branch of learning that transcends existing subdivisions. Strategic policy is worked out on the basis of a wide range of data and therefore it requires those who are carrying out the various related branches of study to collect, compile and study the data and this work is not only required at the highest level of policy making but also by other levels and individual sectors in working out policies and principles because all these levels are interrelated to some extent. Therefore in studying and working out development strategy we need wide participation not only of economists but also of comrades that are responsible for research work in other aspects and it is only in this way that such work can be completed.

V. The Extent of the Application of "Development Strategy"

In summing up the different implications of the development strategy in our country at present there have appeared different views but such differences of opinion do not represent essential differences. They are caused by different understanding of the extent of the application of the concept of "development strategy." For example, some people hold that the postwar development strategy of the developing countries can be summed up as "import-replacement development strategies," "export-replacement development strategies," and "balanced development strategies" while other people hold that the developing countries are implementing a traditional development strategy. Initial analysis shows that there seems to exist a big difference of opinion in this aspect but further analysis shows that is because they regard "development strategy" from different levels. The former view involves industrialization while the latter is related with the whole of society. Consequently, the former clearly terms the strategy as a strategy of industrial development and the latter as a "strategy of economic social development." In our view, in order to solve this question, it is imperative to divide "development strategy" into "macroscopic development strategy" and "microscopic development strategy." The former refers to the strategy of economic social development while the latter refers to the strategy of departmental and partial development. From the view point of actual work, it is necessary to study both of them. According to this classification, the development strategy that is studied by this article must consequently belong to the category of macroscopic development strategy.

VI. The Basic Links of the Formation of "Development Strategy"

Generally speaking, a complete development strategy includes the following basic links:

(1) Theoretical basis. Any development strategy is based on its own basic theory. When we say that development strategy has a practical nature, that does not mean that we can define strategy at will. First of all development strategy involves the question of "how to do" and "how not to do." For our country, in defining the standard for judging economic activities when we are working out development strategy, we must without a doubt take the basic principle of Marxist political economics as a theoretical basis.

(2) Guiding ideology. The guiding ideology of development strategy is based on its theory and this ideology demonstrates the main intention of those who work out and implement this strategy as well as the basic goal of implementing this strategy. This ideology runs through the whole process of the strategy and guides the selection of a strategic goal and defines the criteria for judging this strategy. For example, the guiding ideology of the social development strategy of our country is to realize the basic goal of developing socialist production so as to constantly meet people's ever increasing material and cultural needs.

(3) Objective foundation. In working out a development strategy it is imperative to comprehensively study and investigate the objective which represents the goal of implementing the strategy and this work must become the objective foundation in working out a development strategy. We usually term this work as the study of the national conditions.

we must look at our national condition in an overall way. In addition to political, economic and cultural factors that are often subject to consideration, we must also consider the influences of geography, climate, resources and natural ecological environment on the socioeconomic situation. It is not difficult to generally talk about these factors and yet it is not easy to expose the complicated relations between them. To do this, it is not enough just to analyze these factors through the method of the realtions of ordinary casuality and the method of summing up and consequently it is necessary to encourage study of the use of the theory of new systems and the theory of control.

In addition to the national condition we must also understand the situation of various aspects in the world.

(4) The goal of strategy. The goal of strategy is a very important link in the whole of the development strategy because it not only highly concentrates the basic requirements that have to be completed in implementing this strategy but also reflects the desire of the people. A correct strategic goal is a tremendous force that inspires and attacts people to struggle for it. Therefore to correctly define the strategic goal is a very important question in working out development strategy.

(5) The method for realizing strategy. The method for realizing strategy is an important measure that is taken to realize the goal of the strategy. This method is often manifested as a strategic feature. For example, the development strategy that is carried out by our country today and for a long period in future is mianly realized through the method of intensive expansion of reproduction and of improving economic effects.

(6) The method for evaluating strategy. This method is in fact the method for evaluating the economic development that is achieved in implementing this strategy.

This method of evaluation may be a single goal or other similar goals that are derived from this goal and may be a goal system that is composed of a series of parameters. This method is not only used in determining the pace and the results of the economic development of a country but can also be used in making comparisons internationally.

(7) The form of business management. Business management comprises the main part in implementing strategy--laborers and their organization--and it is related with the question of displaying the initiative of the laborers. Therefore this way is considered a vital link that determines whether the strategy is successful following a correct definition of the strategic goal and strategic method.

(8) The pattern of production technology. The pattern of production technology is often determined by the quantity and quality of the labor force of a country and its level of science and technology and cultural education. The pattern of production technology determines the level of labor productivity of a country. For developing countries, initial development can be made through labor intensive and suitable technology because such countries have surplus labor force and because they are backward technically.

(9) The policy for the development of various industries, departments and sectors. This policy is the strategy for the development of various industries, departments and sectors that is defined around the realization of the general strategic goal and this development strategy is none other than the "microscopic development strategy" that is suggested by this article. The relations between this strategy and the "macroscopic development strategy can be simplified as: the relations between the part and the whole; the relations between the concrete and the abstract; the relations between comparative change and comparative stability and the relations between comparative changes of quantity and comparative changes of quality.

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'JINGJI YANJIU' ON PRC'S AGRICULTURAL STRATEGY

HK210626 Beijing JINGJI YANJIU 'n Chinese No 7, 20 Jul 82 pp 27-31, 20

[Article by Liang Xiufeng [2733 4423 1496] of the Economic Research Institute of the State Planning Commission: "On the Strategy for the Development of China's Agriculture"]

[Text] Ours is a socialist country. The development orientation, principles and tasks, goals of struggle, pace of development, scope of construction, main proportional relations and major construction projects of the national economy are arranged by a unified plan of the national economy and their realization is organized under the guidance of the state plan. Therefore, whether or not the plan for the national economy is scientific, and particularly whether or not the medium- and long-range plan. At present, we are drafting the sixth 5-year plan. The pressing task of the moment is to define a scientific and relatively stable development strategy for the economy and society.

I. Doing a Good Job in the Strategy for the Development of Agriculture Is an Important Link in Realizing the Stability and Prosperity of the National Economy

Agriculture is the foundation of the national economy and the strategy for the development of agriculture is an extremely important component part of the strategy for the development of the economy and society. Therefore, while defining the strategy for the development of agriculture, we must include it in the study of the overall situation of the development of the national economy. On the one hand, we must give consideration to the general prerequisites for the development strategy of the national economy, and on the other, give consideration to the demands of the strategy for the development of the economy and society on agriculture. According to my preliminary judgment, the most rudimentary prerequisite for the development of the economy and society for a relatively long period of time in the future is to ensure steady economic development, political stability and unity of the country and ample food for the people. This must be the most basic national policy of our country and also the fundamental starting point for defining the strategy for the development of agriculture.

First, adopting a correct strategic decision to promote the healthy development of agriculture is a decisive condition for preserving the stability of the national economy. The 30-odd years of history have once again proved this

truth. The main lesson we learned from the "3-year great leap forward" was that the strategy we adopted on questions concerning agriculture and the peasants was far from safe. We regarded the issue of agriculture as having been solved and then proceeded to lay the strategic focus for the development of the national economy on heavy industry and moreover developed heavy industry in an isolated way by deviating from agriculture--this foundation--rather than putting the development of agriculture in the first place of the national economy and urging all trades and professions to support the development of agriculture. On the one hand, the excessively rapid growth rate of heavy industry and the overextended scope of capital construction greatly surpassed the limits that agriculture was capable of supporting and on the other, the mistakes we committed in the rural work which took the "wind of communization" as the center resulted in great damage to the agricultural productive forces, in successive years of decrease in the output of agricultural products, in serious disproportions and in great difficulties in the economic development and the people's livelihood. One extremely important reason for the fact that the national economy has again taken the path of coordinated development since the "3 year readjustment period" lies in the adoption of a correct strategic decision. On the one hand, we lowered the growth rate of heavy industry, curtailed the scope of capital construction and reduced the number of staff and workers so that the development of the national economy could correspond to the capability of agriculture to support it, and on the other, we conscientiously implemented the principle of agriculture being the foundation of the national economy, put the supporting of agriculture in the first place in our economic work and substantially restored and enhanced the agricultural productive forces. Since the 3d plenary session of the 11th CPC Central Committee, there has emerged a fine situation in our national economy, a situation seldom seen since the founding of the PRC and moreover, our national economy has embarked on the path of steady growth. Judged from the economic work itself, what is most essential is that we have adopted the correct strategic principle of "resting and building up strength" in the rural areas. On the one hand, we raised the purchasing prices for agricultural products and reduced or remitted agricultural taxes so as to boost the income of the peasants, and on the other, we imported a fixed quantity of grain in order to readjust the agricultural production structure. This plus other measures resulted in an overall increase in agricultural production and further promoted the steady growth of the national economy.

Next, adopting a correct development strategy to promote the steady growth of agriculture is an important condition for realizing the political stability and unity of the country. Economic stability and political stability and unity are closely related. The 30-odd years of history since the founding of the PRC tell us that the steady development of agriculture is the important material foundation for realizing the political stability and unity of the country. We must soberly realize that the question concerning agriculture and the peasants is all along the essential issue of socialist revolution and socialist construction. If agriculture develops agricultural products become numerous and the income of the peasants increases, this will solve the big problem of the livelihood of the 800 million peasants. The peasants will more closely be united around the CPC and more determined to take the socialist road. If we can find a good solution to this question and unite more than 80 percent of the country's total population, this will mean basically stabilizing the overall situation of political stability and unity of our country. On the one hand,

developed agriculture can provide the cities and industry with more agricultural products and support the economic construction of the country, and on the other, it requires industry to provide more industrial products suited to the needs of the countryside so as to develop agricultural production and improve the well-being of the peasants. In this way, we will have a more solid material foundation for the combination of industry and agriculture and the combination of the cities and the countryside, and the alliance of workers and peasants will further be consolidated and developed on a new foundation.

Again, adopting a correct strategy for the development of agriculture will be conducive to the smooth realization of the strategy for the development of the economy and society.

Ours is a big country with a relatively backward economy. Judged from the current economic situation and the prospects for the future development of the national economy, solving the problem of feeding and clothing 1 billion people is still a matter of prime importance in our economic life and also the most vital strategic task confronting the development of the economy and society in the next 10 to 20 years. The foundation for solving this problem first depends on the steady growth of agriculture. Of the current consumer goods of the urban and rural population throughout the country, agricultural products and the industrial products which use farm products as raw materials constitute 70-75 percent. Therefore, the growth of agriculture constitutes the foundation for realizing the strategy for the development of the economy and society.

II. Proceed From Actual Conditions to Define the Strategy for Developing China's Agriculture

Over the 30-odd years since the founding of the PRC, there have been great advances in the production and construction of our agriculture; the collective economy has gradually been consolidated; the living standard of the peasants has been considerably improved; and the problem of providing food and clothing for the 1 billion population has basically been solved. This is an extraordinary achievement. However, in the course of the development of agriculture, we have undersone difficulties and twists and turns. The reasons for this state of affairs are multifaceted but not having a scientific and stable strategy for the development of agriculture is an important reason. For example, some partial experiences and even erroneous practices of the Dazhai Brigade and Xiyang County were regarded as the fundamental road for national agricultural development. This had harmful effects on the development of China's agriculture.

In order to define a scientific strategy for the development of agriculture by drawing experiences from history, considering the present conditions of our agricultural economy and calculating the demands of the future development of the national economy on agriculture, in my opinion, it is necessary to emphatically solve the following questions:

First, our abundance of manpower and shortage of construction funds is an important question which calls for consideration in defining the strategy for the development of agriculture.

China has more than 300 million peasants capable of full-time labor, but owing to the limited accumulative ability of agriculture at present, the collective fixed assets owned by every peasant capable of full-time labor average only 300-odd yuan. This problem of relatively excessive labor force and lack of construction funds will continue to exist for a considerable period of time to come. We must proceed from this reality and define the basic way for the operations and management of China's agriculture, define the contents and steps of the modernization of our agriculture and formulate the strategic tasks and goals.

Second, in accordance with the conditions of water and land resources, we must define a development strategy which is suited to the needs of the development of agriculture.

With 9.6 million square kilometers of territory, China has a vast amount of territory. However, as far as a big country with a population of 1 billion is concerned, China is a country which is insufficiently rich in water and land resources. Calculated in terms of average per capita, every person has only 1.5 mu of cultivated land (being only equivalent to 28 percent of the world's average 5.5 mu); only 1.9 mu of forest land (being only equivalent to 12 percent of the world's average 15.5 mu); and only 4.3 mu of grassland (being only equivalent to 38 percent of the world's average 11.4 mu). At the same time, improper operations and management has resulted in a decline in the soil fertility of some cultivated land, in limited forest-growing areas, in serious kznnulation of grasslands and in aggravation of soil erosion. This unhealthy state of water and land resources, and particularly the problem of the relatively small area of cultivated land, is tending to continue to develop. This cannot but greatly restrict the development of China's agriculture. Hence, while defining the strategy for the development of agriculture, it is necessary to take the vigorous protection and full utilization of water and land resources, and especially the sparing use of every inch of cultivated land, as an important content and we must guard against wasting cultivated land, wantonly and indiscriminately felling trees, destroying forests and forage grass, blindly reclaiming land from marshland or enclosing tideland for cultivation and damaging water and land resources.

Third, we must properly handle the relationship between grain production and diversified undertakings and gradually readjust the agricultural production structure.

Grain production and diversified undertakings constitute a dialectical unity in which the two complement and restrict each other. In this unity, grain is the foundation for developing a diversified economy in agriculture. Seen from the historical experiences both positive and negative, we have, for a fairly long period of time, paid excessive attention to developing grain production at the expense of correspondingly developing a diversified economy and even crowding out diversified undertakings and one-sidedly concentrated on increasing grain production. All this produced unsatisfactory results: it affected both diversified undertakings and grain production. The reasons for this state of affairs lay, of course, in the mistakes in our guiding ideology and our practical work, but the most essential reason still lay in the low level of

agricultural production we call for "taking grain as the key link to the exclusion of everything else," this cannot be regarded as a historical materialist attitude. It is naturally not good to develop grain production in a one-sided and isolated way. However, we must also pay attention to guarding against another tendency, that is, concentrating only on diversified undertakings and slackening the development of grain production will also [word indistinct] us great harm. Since the production structure of agriculture [word indistinct] mainly determined by the level of development of the agricultural production structure, consequently, the readjustment of the agricultural production structure can only be gradually carried out on the basis of the development of agricultural production. Acting with undue haste will invariably make things go contrary to our wishes.

Fourth, we must correctly understand the actual reality of China's agricultural economy and conscientiously follow the law that the relations of production must correspond to the nature of the productive forces.

Through the 30-odd years of production and construction, great improvements have been scored in the material and technical conditions of China's agriculture and the level of agricultural production has also been raised to some extent. However, we must also soberly acknowledge that seen from the situation of the country as a whole, the situation in which China's agricultural production is mainly operated by manual labor; its cultivation is mainly done by animal power; farm work is mainly done in a scattered way and production is carried out in a manner of self-sufficiency has not fundamentally been changed. Through making a comprehensive analysis of the socioeconomic situation in the rural areas and realizing that the modernization of agriculture is not a matter that can be accomplished in the near future, it can be anticipated that it is impossible to effect a very rapid change in this backward state of China's agriculture. We must proceed from this reality, develop the agricultural productive forces in a planned and steady way, find out the correct forms of the relations of production which are commensurate with the level of development of such productive forces and keep them relatively stable for a certain period of socialist collectivization and public ownership of land and other means of production, and to adhere unswervingly to the implementation of the production responsibility system in the agricultural collective economy. On the one hand, we must avoid stubbornly pursuing the form of "being large in size and collective in nature" and "transition through poverty" regardless of the low level of development of our productive forces and on the other, we must pay attention to avoiding the attempts to imitate the operational and management methods similar to those practiced prior to the cooperativization of agriculture under a situation in which compared with that in the early days of liberation, the level of development of our productive forces has been raised to a certain degree and furthermore, the agricultural collectivization has more than 20 years of history. None of this constitutes a historical materialist attitude.

Fifth, we must make a comprehensive analysis and study and define a scientific strategy for the development of agriculture.

A scientific strategy for the development of agriculture is aimed at appropriately defining the strategic tasks, principles, steps, focal points and measures for the development of agriculture in a certain stage. In addition, these

matters are both extremely complicated and closely related, and they form a whole system. For this reason, to define a scientific strategy for the development of agriculture, we must adopt an attitude of seeking truth from facts and comprehensively study the problems in all fields and only thus can we do this work well. Taking one or two slogans which are far from scientific or some technical terms which are ambiguous and vague in meaning as the strategy for the development of agriculture will frequently lead the development of agriculture astray.

III. Some Tentative Ideas on the Strategy for Developing China's Agriculture

First, the basic way for the development of China's agricultural economy.

The way to develop China's agricultural economy not only depends, to a great extent, on the level of development of our economy and the demands of the country's economic construction on the development of agriculture, but also depends to a great extent on China's agricultural resources, and particularly on the way China's water and land resources are exploited and used. Our country has a huge population but not enough arable land and it is a big country with a vast territory, complicated natural phenomena and a multitude of water and land resources. The development of the national economy and improvements in the people's livelihood raise various demands on agricultural production. This determines that many ways are needed to develop China's agricultural production. We must not only put the existing cultivated land to full use but also pay attention to the use and exploitation of other water and land resources; we must advance production not only intensively but also extensively and take the path of the overall development of the agricultural economy. It seems that the basic way must consist of the following aspects:

1. The basic prerequisite for the continued advance of China's agriculture is to treasure and rationally use the existing cultivated land, carry out intensive cultivation and boost production output. China is short of cultivated land. Although the existing 1.5 billion mu of cultivated land constitutes 10 percent of the total area of our territory, the output value it creates accounts for about 70 percent of the total agricultural output value (if the output value of pig-raising, chicken-breeding and rabbit-rearing which take cultivated land as the basis is added to it, it makes up around 80 percent of the total agricultural output value). This is the source of clothing and food and the origin of existence for the Chinese nation and also the foundation for the overall development of agriculture. China has another more than 500 million mu of wasteland which is reclaimable and suitable for cultivation. If all this wasteland is reclaimed and used, we will have an additional 300 to 350 million mu of cultivated land. However, this would still far from fundamentally solve the problem that China has not enough arable land. At the same time, with the development of the economic construction undertakings and the increase in the building of houses in cities and the countryside, the total area of China's cultivated land is tending to reduce. Furthermore, a large proportion of the existing wasteland reclaimable and suitable for cultivation is concentrated in marshland, saline-alkali regions and arid regions. Exploiting and using large areas of this wasteland will involve huge investments. This is not an easy undertaking to start either under the present economic situation of our country. Thus, in agricultural cultivation terms, we have to take the path of fully using existing cultivated land, protecting and fostering soil fertility, carrying out intensive cultivation and advancing agricultural production intensively. Some

comrades suggest that in developing our agriculture, we should take the road of giving priority to animal husbandry." This is unpractical and unrealistic.

2. We must fully use and exploit the various water and land resources and enhance the scope of agricultural production. The area of China's cultivated land is limited but other water and land resources are abundant. There are broad prospects for developing agriculture, forestry, animal husbandry, sideline occupations and fishery in an overall manner. Our country has more than 1.8 billion mu of forest land; 1.1 billion mu of barren hills and wasteland suitable for forestry; 3.3 billion mu of usable grassland; 700 million mu of grass hills and slopes in farming areas; more than 200 million mu of fresh water surface and vast coastal waters. All these factors constitute a vast space for the development of China's agriculture.

In the past, these water and land resources of our country were not used at all or used quite irrationally and even damaged, which increasingly cramped our efforts in agricultural production for years. With the growth of the national economy and the improvement of the level of our agricultural productive forces, the way for the development of our agriculture will become broader, while farming the 1.5 billion mu of cultivated land well, we must gradually pay more attention to the rational use of forest land, grasslands, grass hills and slopes, fresh water surfaces, coastal waters and barren hills and wasteland suitable for forestry, enthusiastically develop forestry, animal husbandry, fishery and sideline occupations, develop agricultural production in an overall manner and open up a broad way for the development of China's agriculture step by step. Here the question of the transition from "little agriculture" to "big agriculture" is presented for further study. It is known to all that the transition from "little agriculture" to "big agriculture" is the long-range perspective and orientation of the development of China's agriculture. But the rate of progress of this development is mainly determined by the level of development of the agricultural productive forces and by our abilities to use and control nature rather than man's subjective wishes. Therefore, we must not only change the narrow path which confined the development of agriculture only to the 1.5 billion mu of cultivated land but also oppose the assumption of replacing "little agriculture" with "big agriculture" in a short period of time, an assumption which deviates from the actual conditions of China's agriculture.

3. We must study the overall development of the rural economy. Our country has more than 300 million peasants capable of full-time labor. Bringing this huge manpower resource into full play, developing the rural economy so as to help the 800 million peasants steadily become prosperous and putting an end to the poverty and backwardness of China's rural areas constitute a major strategic issue. To solve this problem, various measures must be adopted, one important link of which is to open up new prospects in production and explore new possibilities in production and comprehensively develop the rural economy. At present, China's industrial construction undertakings are mainly concentrated in cities, and furthermore the economic and technical level of the urban industries is, generally speaking, higher than that of the rural areas. In accordance with the steps of development of our national economy, it may possibly take 10 years of preparatory work to ensure economic rejuvenation. For this reason, for a period to come, it will be impossible for there to be any significant change in the strategic layout of the industrial areas. This coupled with the lack of

energy and materials, will make it difficult for the rural industries, particularly the processing industries which use industrial products as raw materials, to develop in a great strike. In order to develop the rural economy in an overall manner, while mainly centering around the development of agricultural production and the well-being of the peasants and in accordance with the prerequisites for the growth of the national economy and in ways suited to local conditions, we should develop the rural industries, sideline production, the construction industry, handicrafts industry, commerce and other economic undertakings, make the rural economy prosper, boost the income of peasants and produce more material wealth for socialist construction.

In short, for a certain period of time, with the 1.5 billion mu of cultivated land as the foundation and the country's 14.4 billion mu of land territory as the starting point, we must advance production both intensively and extensively and develop the rural economy in an overall manner. It impossible that this may be the correct way to develop China's agricultural economy.

Second, we must create favorable conditions for the steady growth of agriculture.

Rationally using and protecting agricultural resources, and especially rationally using and protecting water and land resources so as to promote a benign cycle in the natural ecological situation and creating favorable basic conditions for agricultural production is a major strategic issue of far-reaching significance. Since the 3d plenary session of the 11th CPC Central Committee, the principle of "resting and building up strength" carried out among the peasants has played a positive role. In my opinion, in the matter of agricultural resources, we must also adopt this principle of "resting and building up strength," draw up a long-range plan for portecting, restoring and using agricultural resources and make unremitting efforts to put it into effect. At present, the more urgent problem first is to strictly check the phenomena in which agricultural resources are continuously being damaged; strong administrative interference and economic measures are needed with regard to this matter. For example, the phenomena of excessive felling, grazing and fishing must be severely restricted. Besides, from a long-term point of view, care must be taken to develop agricultural infrastructural measures, such as transforming mountains and harnessing rivers, planting trees and growing grass, and ensuring water and soil conservation and fostering soil fertility. This is an important aspect in effecting the transformation of natural ecological conditions into a benign cycle.

Third, we must follow the law that relations of production must correspond to the nature of productive forces and ensure that diversified economic sector will coexist for a long time.

The actual reality of China's countryside is that we have 300 million peasants capable of full-time labor and, because of the relatively backward rural economy and limited production space, the huge labor potential is far from being brought into full play. The fixed assets of China's rural collective economy are only about 100 billion yuan; public accumulation in 1 year is only several billion yuan. This state of affairs cannot suit the needs of agricultural expanded reproduction. We must proceed from this reality and define the basic points of the modernization program of China's agriculture. We must

adopt positive measures, vigorously develop and raise agricultural productive forces, carry out the method of simultaneously using mechanized farming implements, semimechanized farming implements and hand-operated farming implements for a considerably long period of time, take the path of agricultural mechanization, a path which "combines machinery, horses and cattles" and pay more attention, in the next one or two stages of the 5-year plan, to bringing into play the role of small- and medium-sized farming implements, draft power and small- and medium-size farm machines. Of course, since the level of development of the economy and techniques of the various localities throughout the country differ from locality to locality, we must define different goals of development in light of the agricultural production skills and technical composition of different regions. Considering the increases in total output of agricultural products (particularly the increase in the output of marketable agricultural products) and in the income of the peasants as the center, we should raise the economic effect in an overall manner. We must practically and realistically define the contents, steps and requirements of the modernization of China's agriculture rather than in isolation concentrating on the improvement of labor productivity and one-sidedly seeking the enhancement of the organic composition.

The natural and economic conditions of the various localities of China's countryside are fairly complicated and very vastly from place to place. There are both high-yielding areas with a per-mu yield of more than 1,000 jin and low-yielding areas with a per-mu yield of 100-odd jin or even scores of jin; there are both prosperous brigades and teams with an average per-capita increase of several hundred yuan, and poor brigades and teams with an average per-capita income of only 30-50 yuan; and there are both the outlaying areas of medium-size and large cities and state farms where mechanization and electrification have basically been realized, and the backward rural areas where the "slash-and-burn cultivation" is still being practiced. Generally speaking, the level of the agricultural productive forces and of the income of the peasants in the great majority of the regions of our country are fairly low. Therefore, in realizing the modernization of agriculture, more care should be given to the implementation of the principle of adapting measures to local conditions in light of actual conditions.

The relative backwardness of China's rural economy and the considerable complexity of the economy and productive forces determine that in terms of the forms of the system of ownership in China's agriculture, we must allow the diversified economic sectors and diversified methods of management (including state-run, collectively run, individually operated, and the various forms of joint operations) to coexist for a long time to come rather than adopting only one unitary economic sector. Judged from the trend of development of China's agriculture, for a considerably long time to come, the collective economy will be the main sector of the economy in the rural areas. On this issue, we must have a clear head and a practical and realistic spirit and effectively avoid two tendencies: on the one hand, while extensively implementing the responsibility system of linking remuneration with output in the rural areas, we should not overlook the necessary unified management, unified planning and unified distribution of the collective economy, and on the other, while some advances have been scored in agriculture but the level of productive forces is still not high, we should not again indulge in "transition through poverty" and practice the "several con-

tracts" which bear the nature of the supply system in content. Of course, the concrete contents and the ratios of the diversified economic sectors and diversified means of management are basically determined by the conditions of the productive forces. In consequence, they are not fixed and will certainly change with the development of the agricultural productive forces. Under the circumstances in which the socialist economic system has been established, in achieving this change, generally speaking, we must adopt a fairly slow and gradually advancing method and not adopt a method of launching a so-called political movement.

On the basis of this basic analysis and understanding, I hold that for a considerably long time to come, we must simultaneously use the various types of implements of production and give priority to small- and medium-sized farming implements, allow the diversified economic sectors to concurrently coexist and give priority to the collective economy. This should be regarded as the important principle which calls for consideration in defining the development strategy for agriculture.

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PRINCIPLES OF INDUSTRIAL MANAGEMENT SURVEYED

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[Article by Shen Hongda [3088 1347 6671] and Wan Zhenmao [8001 2182 5399]: "The Principles of Industrial Management in Our Country"]

[Text] The principles of industrial management are the guiding ideas and basic criteria for industrial management work. The principles of industrial management in this country embody the essence and characteristics of socialist production relations, reflect the objective requirements of the laws of economic development of socialist industry, and are concentrated manifestation of socialist industrial management theory.

For many years industrial management in this country has been unable to adapt to or has failed to adapt fully to the requirements of industrial and economic development. One extremely important reason for this problem is that we did not achieve a systematic, consistent formulation of industrial management theory and guiding principles in this country in theoretical and practical terms. Accordingly, it is a major, pressing matter of theoretical and practical importance to conscientiously sum up the lessons of our country's experience in industrial economic management, to assimilate rational foreign principles of industrial management, and to establish industrial management principles for this country.

The establishment and development of industrial management in this country has passed through two major stages, that of the democratic revolution and that of the socialist revolution and construction; as a result they have undergone great changes in the course of the establishment and development of our industrial economics.

At the time of the democratic revolution we began to manage a variety of public-owned industrial enterprises in the revolutionary base areas held by our party, in the bases behind enemy lines and in liberated areas, in addition to leading capitalist industry and individual handicraft industry. Under the conditions then existing, the government applied the guiding ideologies and principles of "developing production and assuring supply," "centralized leadership, decentralized management," "concern for both army and people, for both public and private," and "equal stress on production and conservation,"

as well as "the three great democracies," "the supply system," "appropriate planning," "conversion of industry to the enterprise system," "independence and self-reliance," "serving the revolutionary struggle," and "self-sufficiency" in the guidance and management of financial and economic work, which included industry. These guiding ideas and principles were suited to the needs of the period of the democratic revolution with its diversity of economic components and its low level of productive forces and low management capabilities, they reflected the characteristics of the democratic national revolutionary struggle, while some of the principles also embodied our party's excellent traditions of arduous struggle.

After liberation, when the proletariat became the leading class, the state took over modern large-scale industry and assumed leadership of the diverse economic elements. During the period of recovery of the national economy and the socialist transformation, such principles as "wholehearted reliance on the working class," "democratization of management," "conversion to the enterprise principle," "the responsibility system in production technology," "equal concern for public and private [ownership]," "increased output and conservation," "patriotic competitions," "leadership by the party committee," and "centralized, unified leadership of the large administrative regions." While we were importing Soviety industry and technology we were also studying and adopting Soviet management principles such as "unity of political and economic leadership," "one-man command," and "production region system"; starting in 1956 we replaced one-man command with the plant manager responsibility system and the employee representatives council system under the leadership of the party committee, in addition to propounding such principles of industrial management as "combining concentration of power as the center with local decentralization" and "equal concern for state, collective and individual interests." These principles reflected the requirements of economic recovery and development and were adapted to guiding and managing a diversity of economic components; they introduced the principle of direct party and proletarian leadership of the economy into the set of management principles.

After the socialist transformation was essentially complete, during the three years of the Great Leap Forward movement many industrial principles of the past were attacked and the "Ma-Gang Company Constitution" was criticized; operating according to objective economic laws was ignored and evident leftist errors appeared in industrial economic management. As the 1960's began and the first readjustment of the national economy started, the Party Central Committee drew up the "Seventy Industrial Regulations" and a recovery took place in industrial management principles, with new summarizations in the form of "unity of politics and economics," "the mass line," "the system of democratic centralism," and "energetic conservation and economic accounting," as well as "operation according to a plan," "division of responsibility," and "politics in command, together with material incentives," "combining centralized leadership with large-scale mass movements," "combining revolutionary fervor with scientific management," and "managing the economy according to economic principles." The introduction of these principles embodied a correction of leftist rashness and metaphysical errors in economic management.

During the ten catastrophic years, the economic management of the 17 years up through 1966 was repudiated and the earlier principles of industrial economic management were almost all abandoned; if any principles remained, they were only such slogans as "politics in command," "taking class struggle as the main line," "large-scale mass movements," and "centralized leadership." Since the smashing of the Gang of Four in 1976, the rectification and strengthening of economic management not only has led to restoration of proven management principles of the past but has also resulted in the enunciation of the principles of "primary emphasis on regulation by the plan with a secondary role for regulation by the market," "equal concern for the material interests of the state enterprises, the collective and the individual," and "stressing economic performance," which reflect a new breakthrough and new progress in our country's theory of industrial economic management.

Over the course of more than 30 years, our country's economic management principles have had a tortuous, repetitious, changing developmental history which has taught us a great deal, particularly that a correct understanding of the nature and characteristics of our country's socialist society in its present stage is extremely important for establishing the principles of industrial management here. During one period in the past, in theory and practice alike we denied the objective necessity of commodity production and price laws in our country's socialist society, we denied that socialist enterprises under the ownership of all the people were commodity-production entities with relatively independent economic interests, we denied the need for a diversity of economic components to persist in the present stage in this country, and we ignored or denied the importance of material interests and distribution according to labor. As a result, when establishing and applying the principles of industrial management we frequently placed excessive stress on a high degree of centralization and on having the enterprises closely tied to the government, and we divorced ourselves from our country's economic practice and departed from objective economic laws, as a result of which enterprise and worker enthusiasm was dampened and the development of production was hindered. Secondly, for many years, when summarizing the principles of industrial management we frequently thought only in terms of the economic system itself and paid the most attention to its relationship to political life while neglecting the fact that the economic system is an organic component of the entire complex system of social life and that economic practice is closely connected with and in a mutually constraining relationship with other aspects of social life (not only government, but law, social psychology, science and technology, culture and education and the like). The principles of industrial management which were set up in contravention of the organic connections between these aspects inevitably failed to be fully effective in practice and accordingly people were led to doubt or reject the management principles. Third, in the past, this country's principles of industrial management have for the most part been established and developed with a focus on the social nature of management, with little attention paid to the natural affinities of management. Sometimes management was even thought to be merely part of the superstructure and management principles were thought to be nothing but an expression of a class standpoint and interests. As a result, in the practice of industrial management we generally replaced all other principles by political principles in the belief that so long

as we had political principles our problems could be solved; in addition, we generally created an artificial separation and opposition between politics and economics and between politics and technology which had a negative effect on the continuous improvement of industrial management standards and the rationalization of the management system. Finally, in industrial management theory we made the error of uncritical dogmatism, but in addition we also made the mistake of cutting our country off and were guilty of parochial arrogance. Foreign capitalist industry has already had more than 200 years of history, and in the last 30 years modern science and technology have developed at a rapid pace; in many countries a series of industrial management principles have been developed on the basis of production technology, production relations, social thought, administration and management, interpersonal relations, social psychology and government intervention, as well as political, legal and educational-moral effects on industrial development. These principles reflect their origin in terms of production relations, which should be distinguished be distinguished and rejected, but they also reflect to a considerable degree the management principles required by the law of modern industrial and economic development, which unquestionably merit conscientious study and adoption by this country. We have ignored these principles for a long time and have categorically rejected them as "revisionist" or "capitalist," which is inevitably a wrong policy.

In order to establish correct principles of industrial management for this country, we must make the scientific socialist principles of Marxism and the nature of our country's socialist society in its present stage the point of departure, while taking account of the level of development of the productive forces and production relations in the present stage. In addition, we should rely upon the theory and systematized ideology of the dialectic relationship between production relations and the productive forces and between the economic base and the superstructure to place industrial economic activity within the overall activity of the social system, and should make a thorough study of the internal and external relationships of industrial economic activity, examining the basic content of the principles of industrial management in terms of their interrelationships and interactions. In addition, on the basis of the dual nature of management we should make a thorough study of the social factors and production-technology factors which affect industrial economic life, master the laws governing their changes, and lay down specific principles which reflect this multiplicity of factors. Unquestionably, when pursuing these investigations we must integrate them closely with our 30 years' experience with industrial management principles and borrow what is beneficial to our country after an extensive investigation of foreign industrial management theory and principles.

Based on the requirements stated above, we believe that the fundamental principles of industrial management for our country in the present stage may be summarized as follows:

1. Integration of economics with politics in industrial management. Economics is the foundation and politics is the concentrated expression of economics: the two are a union of opposites. In industrial management, economics and politics play independent roles while affecting and

constraining each other. In the first place, economic leadership and political leadership are two different areas and processes. Political leadership in management is a matter primarily of the correct party line and general and specific party policies, not of administrative, technical or functional leadership or leadership in terms of specific management actions. By "correct party line and general and specific policies" we mean that the standard must be adherence to objective economic laws and expression of the people's interests. Political leadership of this type requires that all industrial management levels adhere to party leadership and the socialist road, and that they follow the party line and general and specific policies and implement the principles of democratic centralism. Economic leadership in the enterprise consists of exercising independent, systematic, forceful operational command and management of the multifarious and complex processes of production, exchange, circulation and distrubition of the basis of objective economic and natural laws. Ultimately, economic leadership is the focus and center of industrial management: "Even though other factors such as political and ideological ones may have a great effect on economic conditions, in the final analysis economic conditions are of decisive importance; they constitute a red thread which runs through the entire development process and which alone can enable us to understand it" (Complete Works of Marx and Engels, Vol 4, p 506). Politics springs from economics and serves economics and accordingly political leadership must permeate all functional, technical and production processes in industrial management, and must, by detailed propaganda, ideological and organizational work, correct handling and adjustment of the relationship between the party and industrial or management organs and economic organizations at all levels, and the example and vanguard role of party members in industry, assure that political leadership and the economic movement proceed smoothly.

2. Integration of economic with administrative management in industrial management. Our country's industrial economics in the present stage is socialized large-scale production based on public ownership of the means of production, in addition to which it is a planned, commodity-oriented economic system; all enterprises are relatively independent commodity-producing units. Accordingly, industrial management must be based on the requirements of economic laws, and industrial activity must be organized on the basis of economic principles. This requires that we utilize commodity and currency relations, make use of various kinds of value categories (such as price, profit, taxes, loans, interest and the like) and take account of the material interests of economic entities at all levels in managing industrial economic activity; this will give us feedback, enabling us to make further use of the initiative of the economic organizations at various levels and to increase their adaptability, and will promote their ability to independently find optimal management and production programs. But because the state is in control of the largest and leading part of the industrial economy and can and must use the industrial information furnished by the planning, statistical, banking and commercial departments to strike a balance in advance, the state and social centers can exercise centralized management and apply the necessary planning and directive adjustments to industrial economic activity as a whole. Even more, the economic activity of an enterprise, a department or industry as

a whole is in the last analysis only a part of the national economy and is a relatively microscopic economic activity, so that the two aspects are both unified and in conflict. Although economic organization, economic levers and economic measures can effectively regulate the contradictions between macroscopic and microscopic activity to a considerable degree, under certain conditions the contradictions between the two cannot be resolved by economic organization or economic levers; this requires that the state, under proletarian dictatorship, which has direct economic functions, must use the requisite administrative organs, administrative commands and administrative measures to exercise a certain degree of authoritative administrative management over the various microscopic economic activities in order to regulate both macroscopic and microscopic activities and to assure the economic effectiveness of the whole. Capitalist states, where private ownership is the basic form of ownership of the means of production, coordinate the macroscopic and microscopic economies in order to protect the interests of the bourgeoisie and prevent economic crises and unceasingly intervene administratively in state monopoly capitalism and the entire capitalist economy; but a socialist country established on the basis of socialization of production and public ownership of the means of production is more able, and has a greater obligation, to carry out effective administrative management of industry as a whole and of the entire national economy.

The two types of management mentioned above are organically interconnected in industrial practice and express not only the mutually supportive articulation of two different processes but also their interpenetration. Economic management methods include administrative-legal forms (such as the legally established numerical values involved in economic levers, market management regulations, price management methods and the like), and the directives issued and the steps taken by political management make all possible use of material incentives and other economic principles. An overuse of economic methods may well divorce the parts from the whole and produce a tendency for all parts to go their own ways, or may even result in a loss of macroscopic economic control. If only the administrative methods are used, power may become excessively centralized and economic control too tight, which will make it more difficult to stimulate the macroscopic economy. Accordingly, the manager's task is to use both economic and administrative management with reference to the specific situation of the individual stage of industrial development in order to achieve a suitable synthesis.

3. Integration of economic regulation with legal regulation in industrial management. Industrial economic activity is purposeful human activity. On one hand it is controlled by objective economic laws, while on the other hand it is affected by subjective human factors. Accordingly, the conduct of industrial economic activity must adapt the subjective to the objective and achieve an organic unity of subjective and objective factors. Industrial economic management must above all make use of economic laws and carry out various types of regulation by economic measures; at the same time, it must also request to use various noneconomic methods of regulation belonging to the superstructure, including legal methods. Although political leadership and administrative management are important manifestations of party and state management of industry, they have no economic responsibility of a legal type

with regard to the economic leadership organs, economic entities and individuals. When conflicts of economic interest arise between the various main economic elements or when those in leadership positions exceed their authority and prevent compensation of operating organizations' labor expenditures, so that the forecast economic results cannot be obtained and there is great waste, the problem of what responsibility the two sides should bear is resolved by noneconomic methids; legal regulation as part of management relies on state power, regulating contradictions between the abovementioned major industrial economic entities' economic interests through economic legislation, judicature and enforcement. The economic laws in which these legal regulatory powers are embodied authoritatively lay down in legal form the objective relationships between effective economic methods, the principles and techniques of organizational management, and the various levels of economic activity. The various organizations involved in economic activity must institute horizontal or vertical commercial and economic relationships in accordance with these economic laws and must bear legal responsibility and assume legal duties; those who do otherwise are to be dealt with according to law. Undoubtedly this type of legal regulation within industrial management can do a great deal to maintain order within economic activity and prevent exclusive reliance on administrative decree and the resultant arbitrariness and subjectivity in economic management. At the same time, the laws also guarantee the socialist orientation of industrial production management and protect the inviolability of a diversity of economic components within industry, in addition to which they can further guarantee that market regulation effects will be correctly be brought into play within the planned economy and can protect the rights, responsibilities and interests of industrial economic entities at all levels. The experience of modern industrial development has long since made it clear that legal factors have a rather great effect, and in many countries the effectiveness of management of or intervention in industry is greatly affected by the depth and breadth of legal regulation. Accordingly, in industrial management in this country the combined use of legal regulation, economic and administrative methods, and political work is inevitably an important principle.

4. Integration of economic factors with production technology factors in industrial management. On the basis of the Marxist-Leninist principle of the duality of management, when exercising industrial economic management we must not only rely on the effects of social and economic factors but must also proceed in accordance with objective requirements posed by the science and technology of industrial production. The great development of the science and technology of industrial production in the last 100 years has already provided some effective specific principles, such as the unified command and staff system, standardization, the production region system and combination of qualitative with quantitative factors; these principles of production technology are exerting an increasing influence on industrial economic management.

Economics and the area of science and technology are interrelated and mutually constraining. In the process of social development, scientific and technical progress is a decisive factor for rapid economic development, and economic needs and the level of economic development are the motive power and material

preconditions for scientific and technical progress. The history of industrial development proves that the dialectical relationship between economics and production science and technology is an objective law beyond man's power to change it. Economics is the motive force, production is the foundation, and the continuing development of production poses technological requirements; technology is the interface between science and production, and technical progress promotes continuous development of scientific theory, while the materialization and application of science in production is carried out through the modernization of technology, ultimately resulting in continuous economic growth. Today, the characteristics of modern science and technology themselves are determined by the fact that generally a rather long period is required between investment and the realization of economic results; this produces a contradiction in management between science and technology on one hand and economics on the other. Furthermore, the utilization of science and technology does not mean that economic results are inevitably attained. To a great degree this is determined by the scientific standards of management and the quality of management work. Accordingly, in industrial management we must proceed in terms of economic rationality when adopting new science and technology and modernizing technology and must take thorough account of economic necessity and possibilities and economic results, while on the other hand in planning and implementing economic development we must allow thoroughly for the use of domestic and foreign advanced science and technology, and must continually adjust the relationship between economics and science-technology to achieve the optimal combination of the two.

The present development of science and technology makes them increasingly a direct productive force, and makes scientific and technical progress an object of management, so that gradually a complex organic system of close interrelationships between science-technology and production has developed. As the social productive forces develop further, on the one hand industrial personnel engaged in science and technical research and the material and funds involved have begun to exert a major effect on the basic proportionalities of the reproduction process; and on the other hand, the high level of development of science and technology is becoming a direct cause of major changes in economic management functions and methods. For this reason, it is increasingly necessary that industrial management closely integrate economic factors with production and scientific-technical factors.

5. Integration of economic factors with social-psychological factors in industrial management. From a sociological standpoint, neither industry as a whole nor individual departments, branches, companies and enterprises are solely production and economic entities; they are highly complex societies and organisms, within which certain political, legal, moral and interpersonal relationship have grown up between collectives and between employees; these social relations have a great effect on management and industrial production; in particular, the rapid acceleration of scientific and technical progress, the increasing of socialization of lavor, and changes in the ideological and cultural attainments of the workers are causing social-psychological factors to have an increasing effect on industrial management. On one hand, this effect results from the increasing complexity of technical processes and the rapid increase in quantities of information, greatly intensifying mental work

and gradually increasing the psychological load on employees, and from the fact that under conditions in which the employees' creative capacities and conditions have objectively undergone abrupt changes, social-psychological capabilities for rapidly expressing these factors are urgently needed. On the other hand, because employees' social knowledge and cultural and educational attainments have been enriched and ideological standards are gradually being raised, and in addition because public information media have increased in number, social-psychological relationships between employees and between the collective and employees are becoming richer and more varied. This circumstance cannot fail to make the social-psychological condition of workers, collectives and economic entities in present-day production exert an increasingly great influence on industrial development. Actually, in present-day industrial management, the economic factors are increasingly becoming integrated with social-psychological factors, so that they clearly interact and constrain each other. The workers, collectives and economic entities, which are the main objects of economic management, have long ceased to be purely technical and economic objects: they are organic systems with a social nature and psychological characteristics. The efficiency and performance results of these systems are determined not by individual technical and economic factors, but by the optimal combination of technical-economic and social-psychological factors. As a result, carrying out suitable planned organization and adjustment of labor psychology, engineering psychology and social psychology in coordination with economic and technical progress has already become an important component of industrial management, particularly as regards interaction between collectives expressed in social-pyschological terms and as regards investigation and organizational management of individual behavior and psychological conditions within the collective. The development of foreign management theory and practice has ceased to be solely the province of economists, engineers, scientists and management experts, but rather includes the results of joint efforts by anthropologists, sociologists, psychologists, aesthetic specialists, biologists and a wide range of practical workers.

6. Integration of material production with education in industrial management. As a social phenomenon, education is closely connected with economics. Under conditions of large-scale mechanical production, education has already become a progressive department of material production, and educational work is becoming increasingly tightly integrated with production work. Especially as a result of the extensive utilization of modern science and technology in production, it is necessary to increase continually the proportion of mental work done by employees, and accordingly education is increasingly directly related to material production.

In industry, science and technology progress unceasingly and the production technology innovation cycle is becoming shorter and shorter, so that the rate of "obsolescence of knowledge" is increasing. As a result, "continuing education" of employees aimed at continuously replenishing and updating the knowledge obtained during the school years has become an objective necessity of economic development. In addition, the continuing changes in division of labor in social production resulting from scientific and technical progress

require that employees continually acquire new knowledge so as to increase their ability to handle updated duties and functions. This educational labor has already gone beyond school-age education and has become an organic component of modern industrial production work. It and material production work in industry are complementary, mutually supportive and mutually constraining. Industrial management in the industrialized countries accords great importance to "development of capabilities" and to "investment in knowledge" and integrates science-technology, production and education into a decisive force in economic development--and with good reason. Accordingly, it is an important principle of industrial management that the optimal combination of material production and educational labor must be arranged in accordance with the needs of economic development and with reference to the laws of educational activity itself.

We must utilize these principles systematically and comprehensively in the practice of industrial management. We must implement them only in coordination with implementation of the specific principles in all areas. To this end, we must use the basic principles described above as a basis for mapping out and fixing a set of rather specific political, economic, production-technical, legal, social-psychological and educational principles derived from the economic movement itself (this is the subject of another article). This will produce a set of complete industrial management principles which are in accord with modern scientific management and with our country's specific conditions, which will exert an important guiding role in raising our country's industrial management standards and in reforming our industrial management system.

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NATION'S VAST UNDERGROUND SHELTER SYSTEM LENDS ITSELF TO WIDE VARIETY OF USES

Chongqing DIXIA GONGCHENG [UNDERGROUND ENGINEERING] in Chinese No 4, 1982 pp 28-33

[Article by Lu Xicun [4151 2497 2625]: "Peacetime Use of Civil Defense Structures Is Promising--Inspiration From a Certain Factory Which Converted an Underground Air Raid Shelter Into a Thermostat Controlled Laboratory"]

[Text] Foreward

For over 20 years, every locality throughout the nation has mobilized many people to build civil defense structures. For this, a lot of funds, manpower, and materials have been used. Many structures were kept shut and not utilized after their completion. In peacetime, they did not produce a return on investment and their combined use in peacetime and in war was not realized. Construction of some structures ceased half way through and they became burdens. Whether these structures can be used in peacetime on a widespread basis so that they can develop the function they should in building the four modernizations is an important subject that is related to whether a return on the investment of massive wealth of billions or tens of billions can be realized. For 32 years, the nation's civilian and military populations have given their energy, their blood and even their life to building our nation's underground Great Wall. I also had such a personal experience. Every square meter--from large civil defense underground warehouses to civil defense works--was built with great effort! If a building of several thousand square meters is kept shut and not used for several months after its completion, many people would quickly say this is a waste and would immediately express their opinions. But underground tunnels and warehouses or civil defense structures that cover over 10,000 square meters are hidden underground, unseen. Except for a few people, who knows that this is an accumulated waste much larger than uninhabited houses? The building cost of an underground structure per square meter is several times to several dozen times higher than that of a square meter in a residential building. But because it is not a skyscraper, its wastefulness is not readily detected.

We should follow the policy of combining the use of civil defense structures in peacetime and in war and draw up a unified plan for various types of civil defense works and underground tunnels and warehouses so that they can be utilized in peacetime. I believe everyone will approve of this. Maybe a lot

of comrades engaged in civil defense have already thought about this and have even campaigned for this. But can they be widely utilized? This needs to be explored actively. In recent years, many cities have converted centralized civil defense tunnels and air raid shelters into "underground restaurants, underground ice cream shops, underground hotels." This is a welcomed beginning. The Wuyang Underground Restaurant in Guangzhou is welcomed by the city's residents, especially young people. It is a pity that only a few of the many civil defense structures throughout the nation have truly been utilized. I believe if all people throughout the nation pay sufficient attention, unify understanding, think of ways, draw up an overall plan for the peacetime utilization of civil defense structures, develop the advantages and avoid the shortcomings, renovate and develop the potential and actively utilize them, then, ways will be found to widely utilize civil defense structures in all professions.

Here, I will describe how a certain factory utilized an underground air raid shelter to build a thermostat controlled laboratory. This temperature and humidity controlled air conditioned underground laboratory has been used for 8 years and it has contributed towards elevating the quality of bearing products. But his thermostat controlled laboratory still has many shortcomings, for example, problems of leaks were not dealt with in time and this affected its use. The leaks were reparied only after a long time. After the thermostat controlled laboratory was completed, variations in temperature and humidity were not systematically and accurately measured and tested and efforts were only done to satisfy product inspection. Work to summarize and improve the situation and exploratory studies were not done. But its long period of use has enabled us to obtain a rough understanding that "peacetime utilization of civil defense structures has a bright future."

(I) On Converting Civil Defense Structures Into a Thermostat Controlled Laboratory and Its Results

In 1971, we designed and built a simple dug-out type underground air raid shelter at a certain factory. The underground shelter was situated under the southern slope of an earth mound inside the factory. The construction area of the underground shleter covered some 700 square meters and the useful space was about 500 square meters. There are a total of 3 entrances and exits. The main entrance and exit near the inspection department were designed to have a gas defense vent, a poison air filtering and ventilating chamber and a reserve power room. We utilized one door and converted it into a peacetime termperature and humidity controlled laboratory while retaining its function as an exit and entrance during wartime. This underground thermostat controlled room was built for the inspection department to install precision instruments to inspect bearings. Bearings are precision machinery parts, therefore their counting and inspection instruments require an even higher precision. To prevent the instruments and counting tools from the effects of external temperature, the instruments must be placed in a temperature and humidity controlled room. The rebuilding of the exit and entrance of this underground shleter into a thermostat controlled room was not easy. We encountered difficulties and resistance. People's understanding was also continously elevated and unified in practice.

After construction and 8 years of use, we may say with some assurance: "We have basically succeeded in utilizing civil defense structures although there are still many shortcomings."

Things happened this way: In 1972, the factory decided to build a thermostat controlled laboratory to concentrate on product quality and to provide necessary conditions for counting and inspection. But where should this thermostat controlled room be built? How should it be built? One plan after another was submitted to the factory authorities and everyone had a different opinion. In order to spend less and to rapidly put the project to use, we followed the designing experience of the past and proposed converting the two rooms at the exit and entrance of the underground shelter next to the quality inspection department into a temperature and humidity controlled room and designed it for both peacetime and wartime use. After repeated studies, the factory chose our plan. But, after construction began and after the top of the underground shelter was covered with soil, the shelter was flooded by rain water because during its original construction a construction seam on the top of the shelter was not handled properly. Some comrades saw this but did not understand the cause and lost confidence. They doubted whether this thermostat controlled laboratory could be built in this civil defense underground shelter. Because of divergent opinions, construction stopped. After a very long time, some people advocated another plan to build it on the ground because the factory was waiting to build and use it. But applying for investment and waiting for arrangements to design and build it affected efforts to grasp quality. Whose opinion was right and whose was wrong had to proven in practice. After repeated investigation and study, we understood that there were two reasons for flooding in the underground shelter. One reason was that the construction seam leaked. The other reason was that mist was produced by the damp air between spring and summer because there was no air conditioning. During the seasons with less evaporation, more and more water accumulated, and as the popular saying says, "drops of water can become a river." Grasping this main conflict and treating each problem with appropriate measures one by one, we finally completed this underground thermostat controlled room. It was a pity that at the time, the leaking ceiling was not fixed thoroughly, and some problems remained. After a long time, the decision was made only after the laboratory had been put to use to remove the earth on top to repair the leak from the outside to solve the problem. The construction and design of the thermostat controlled room converted from the underground civil defense shelter are separately described below (for details, see the accompanying figure):

1. The building plane of the underground thermostat controlled room (Figure 1)

The reserve power room for wartime use in the underground air raid shelter was converted to a temperature and humidity controlled room for installing precision inspection instruments for bearings. The poison gas filtering and ventilating room was converted to a room housing the air conditioning unit. An insulating door was installed at the position of the protective door of the civil defense structure. The total building area of the thermostat controlled room was 97 square meters, and the area occupied by the room housing the temperature and humidity controlled counting and

inspection instruments was 40 square meters. The room housing the air conditioning unit occupied an area of 26 square meters. The three-dimensional space that needed air conditioning amounted to 113 cubic meters.

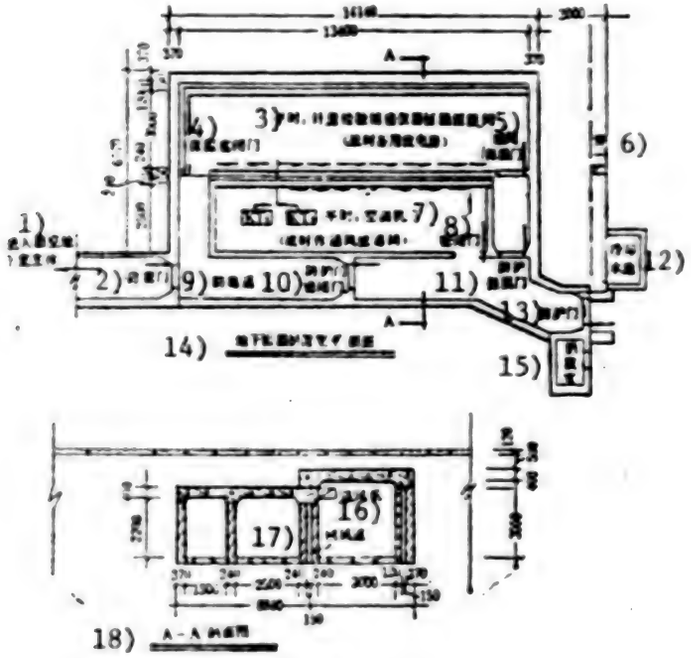

图 1

Diagram 1

1 Entrance to the main chamber of the air raid shelter
2 Protective door
3 In peacetime: Temperature and humidity controlled room for precision counting and inspection instruments (reserve power room during wartime)
4 Temperature insulating door
5 Temperature insulating door
6 Earth blocking wall
7 Peacetime: room for air conditioning unit
8 Closed door
9 Poisonous air prevention vent
10 Protective door
Closed door
11 Protective and temperature insulating door
12 Cooling water pool
13 Protective door
14 Plan for the underground temperature and humidity controlled room
15 Wave attenuation room
16 Vetilator
17 Return air duct
18 A-A section diagram

2. The Structural Type of the Underground Thermostat Controlled Room (Figure 2 and A-A section diagram of Figure 1)

The original underground shelter was designed as a simple shallow civil defense and resistance shelter. The reinforced concrete roof was 40 centimeters thick covered by a layer of soil of 50 to 70 centimeters. The ground surface was covered with 10 centimeters of coal slack concrete. The side walls were brick walls 37 centimeters thick laid with No. 100 bricks and No. 100 cement mortar. The exterior was a rigid water-proof layer and another single interior earth wall for defense was erected 15 centimeters from the exterior wall, forming a lined inner wall. The 15-centimeter gap contains water pipes leading to the outside and it serves to prevent seepage and leakage and insulate temperature. Use of the facility has proven that the walls themselves have not leaked.

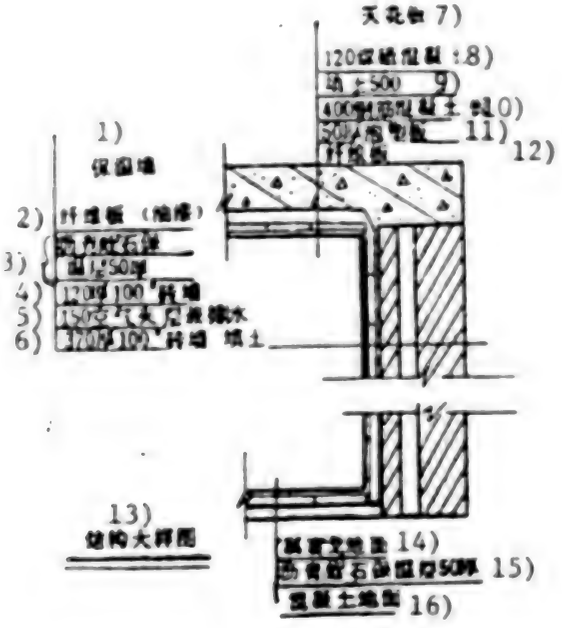

图 2

Figure 2

1 Temperature insulating wall
2 Fiber panels (paint)
3 Asphalt vermiculite temperature insulating layer of 50 thick
4 Brick wall of 120 thick and 100
5 Sandwiched air layer of 150 serving as drainage
6 Brick wall of 370 thick and 100, earth rilling
7 Ceiling
8 120 coal slack concrete
9 Earth filling 500
10 400 Reinforced concrete slabs
11 50 thick foam panels

12 Fiber panels
13 General structural diagram
14 Mosaic tile ground surface
15 Asphalt vermiculite temperature preserving layer 50 thick
16 Concrete ground surface

The thermostat controlled room is buried in the earth and it also has a lining of inner walls. The room thus has a fairly good ability to insulate temperature. The surface of the walls are only treated simply and they could satisfy the original requirements. But because we were waiting to use the structure and to make sure, we still built a temperature insulating layer on the surrounding roof and ground surface to prevent the effects of ground temperature. The temperature insulating material for the false ceiling was foam panels with fiber panels glued at the bottom. The temperature insulating materials for the side walls and the ground surface were prefabricated temperature insulating vermiculite asphalt test produced by ourselves because we took into consideration that such materials had to insulate temperature, prevent leakage and corrosion, so we did not use ordinary materials. The vermiculite blocks were 5 centimeters thick pressed from hot asphalt mixed with vermiculite granules. Asphalt was also used to glue the prefabricated blocks onto the walls or the concrete floor. The walls were then decorated with fiber panels as the final surface. The ground surface was covered with prefabricated vermiculite blocks, and hot asphalt was used to glue mosaic tiles (mosaic) onto the blocks. We did not have any experience nor information on these materials and techniques. We developed them entirely by ourselves. But, the results in use prove that such prefabricated temperature insulating layers of vermiculite ashpalt are good temperature insulating materials for underground shelters. It was a pity we did not have the condition to measure the layer's coefficient of heat conduction, but it is expected to be a good temperature insulating material. It is resistant to dampness and corrosion, and conversely, such a technique of laying the layers produces a water-proof layer. We can say it is killing three birds with one stone. Although foam plastic is a superior temperature insulating material, but the price is high, it ages after a period, and it does not have sufficient strength to resist pressure. Vermiculite asphalt blocks can be laid on the ground surface as a pressure supporting layer. For ground surfaces of ordinary scientific research facilities or civilian residences, its strength is sufficient. But the granules of vermiculite powder are large, manually mixing will affect the worker's health, thus this work should be done centrally and mechanically in a factory. Now, another layer of soft plastic panels has been laid on the floor of the factory's underground thermostat controlled room. This is because the users are afraid that the counted pieces may fall onto the floor and become damaged.

3. Air Conditioning System (Figure 3)

We should recognize that because this was done by ourselves, the design for air conditioning lacked necessary computational data. Because the scale was very small, the selection of equipment and ventilating pipes was done according to common experience.

We installed two KT3 model air conditioners manufactured by the Guangzhou Refrigerator Plant. One was installed as a reserve. This type of air conditioners uses water cooling to dissipate heat. The heat dissipation of each unit was 6,000 kilocalories/hour, but the maximum supply of cold air was 2,400 cubic meters/hour. To conserve the use of water, we installed only one simple recycling water pool onside the room. If we used a spray cooling tower, the results might be better.

The ventilator uses rectangular ventilation ducts made of aluminum plates. The space between the walls was used as the return air ventilation duct of the original design. But because ventilation without ducts can basically satisfy the demands, therefore, a ventilator was not installed for the return air ventilation duct. Actually, this is a type of overpressure duct-less natural ventilation. Because of this, workers frequently open the temperature insulating doors, otherwise, the room becomes stifling after long hours. Because the door is opened, the stability of temperature and humidity is affected. This should be perfected in design.

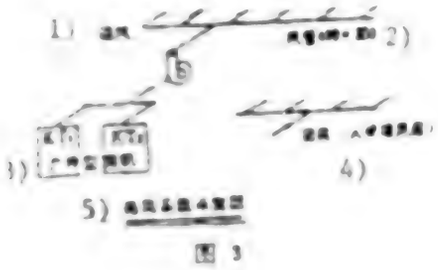

Figure 3

1 Air exhaust
2 Air vent
3 Guangzhou Refrigerator Plant's air conditioner
4 Return air (sandwiched air duct between walls)
5 Illustration of ventilation system

The air conditioner is turned on only during daytime working hours. It operates from 6 to 7 hours. At night, the air conditioner is turned off for over 17 hours. The variations in indoor temperature and humidity are as follows:

Indoor temperature in winter: 18°C-22°C.

Indoor temperature during peak of summer: about 26°C.

Relative humidity indoors in ordinary seasons: 60 percent to 70 percent.

Relative humidity during the damp season of plum rain: not over 80 percent.

Because the temperature and humidity can satisfy the requirements of product inspection at the factory, therefore, tests and observations to further improve the conditions to stabilize temperature and humidity were not conducted. It is expected that if a ventilator is installed, if the temperature insulating door is constantly kept shut, if the air conditioner is kept operating for an appropriately longer time, or if two air conditioners are operated at the same time, then the indoor temperature and humidity will be more stable. The temperature will be closer to 20°C, and higher requirements for constant humidity and constant temperature can be satisfied.

The long period of use of the underground thermostat controlled room shows that it not only has stable temperature and humidity, it also has a good ability to resist interference. There will be visible results in sound insulation, dust prevention and earthquake prevention. Even though there are many sources of noise and vibration in the factory area, entering the thermostat controlled room makes one feel as if he had entered a quiet and clean residence. Also because we did not have the means, we were unable to quantitatively measure the dust content in the air, the decibel values of noise and the attenuation of vibration.

The long period of use not only convinced those comrades who originally doubted the feasibility of the underground thermostat controlled laboratory, many conrades gradually realized that the underground thermostat controlled laboratory was better than such a laboratory on the ground. This was realized after the leaks were thoroughly plugged up. It was better in temperature insulation, resistance to interference, dust prevention, safety and protection, conservation of investment, conservation of electricity and conservation of land than plans for building such a laboratory on the ground. Of course this termostat controlled laboratory is not perfect in every way. As had been mentioned, because the ventilator was not installed according to design, workers became uncomfortable after long hours, and the problem with water leaks was also delayed a long time before it was thoroughly solved.

(II) It Is Not Impossible To Avoid Dampness in Underground Shelters if the Problems of Air Conditioning and Water-Proofing Are Solved so That Various Types of Civil Defense Structures, Tunnels and Warehouses Can Be Widely Utilized

Ordinarily people mistakenly believe that underground shelters are necessarily damp. Actually this is not so. The underground thermostat controlled room and the communications station of underground command posts all prove that underground rooms with air conditioning facilities are even drier during the damp seasons than surface structures without air conditioning. This is because during the overcast and rainy season between spring and summer, atmospheric humidity is generally over 90 percent, but the humidity in the thermostat controlled room is always below 80 percent and it can even be controlled to below 70 percent. Why is this?

Dampness in underground shelters is mainly caused by leakage and mist. Underground chambers with good water-proof conditions but without air

conditioning will also accumulate water from indoor mist during the season of plum rains. Therefore, the way to solve leakage is to include effective water-proof measures in the design and in construction. The way to solve mist relies on artificial treatment of air, this means air conditioning.

For the thermostat controlled room to maintain a constant temperature, there must be temperature insulation, enclosure and air conditioning. Thermostat controlled rooms built above ground will also become damp and have a room full of water droplets during the damp season if the thermostat is not turned on for a long period and if the door of the room is not opened to allow air to enter freely. This situation frequently occurs in the bottom floors of tall buildings.

The reason for the emergence of mist is the season of plum rains. The relative humidity of air frequently reaches 90 to 95 percent, and it may even approach saturation, i.e., the relative humidity approaches 100 percent. The room temperature in underground chambers and thermostat controlled rooms above ground is generally much lower than outdoors (in spring and summer). When outside damp air enters the underground chamber without being treated, the temperature of the air will drop when it encounters cold air inside and the relative humidity will increase and surpass saturation. The water vapor in the air will become liquid and when it comes into contact with objects it will form a water droplet. This is the phenomenon of mist. We know from experience that in general, when the difference in outdoor and indoor temperatures surpasses 9°C during the damp season, mist will form underground and above ground. Therefore, the ground floor of surface buildings that are not ventilated is no exception. But, air that has been conditioned before it enters the underground chambers has a lower temperature and the temperature difference is reduced, therefore conditions for the formation of mist are eliminated. According to this principle, the conclusion that underground chambers must be damp is not valid. Many high grade underground structures that were built to meet special requirements in our nation and abroad prove this principle. Water-proofing and air conditioning must be done well. All kinds of buildings can be built underground. When people grasp this natural law, we will be able to confidently use the various types of air raid shelters and underground tunnels and warehouses which we have already completed or which are about to be completed. There is no reason to put them aside, or abandon them and not use them.

Realization

With the emergence of nuclear weapons, every nation launched massive construction of civil defense structures and various military and civilian underground structures after the war. Militarily threatened for a long time by the two superpowers, China was forced to take active defensive strategies. For a long time, each sector carried out massive underground construction. These underground structures are showing their importance as the neutron bomb is developed. The achievement in massive civil defense construction is the main achievement, but civil defense construction is the same as other capital construction projects. The battlefront has been

extended too long, the scale is too large, detailed planning is lacking, and it has surpassed our nation's allowable economic capabilities at present. In particular, Lin Biao distored and changed the correct policies of the Party Central Committee and tossed out the mistaken policies of "hiding in mountains, dispersion, hiding in caverns." He blindly advocated establishing installations near mountains, in mountains and in caverns without regard to the conditions. A lot of ineffective labor was carried out, the people suffered and money was spent. The waste was great. Civil defense construction in cities was also affected by this mistaken policy and loss was created.

Some construction projects did not meet the requirements for combined peacetime and wartime use. After they were completed they were tossed aside, abandoned, left unused and not maintained. Some construction projects were hastily built without plans, without designs, without approval. The scale was too large and the projects were accepted wherever they were left off. Construction was forced to end whenever money and materials were exhausted. As soon as construction stopped, the projects collapsed and injured people. For example, an air raid shelter in the earth layer of a certain factory went through the bottom of a shop, the shelter collapsed and the foundation of the shop sank, making the shop a dangerous building which had to be shored up. Physical injuries and death have occurred everywhere in building civil defense projects: To carry out civil defense projects, each unit had to assign manpower to the projects for a long time, therefore even though accounts of the construciton could be found, a lot of investment was not recorded. These civil defense construction projects that lacked unified planning created a great difficulty for urban expansion and rebuilding. Many air raid shelters have become propagation grounds for mosquitoes. In recent years, residents have commonly felt that there are more mosquitoes than before. The civil defense works that were built in the past with a lot of effort by factories, schools, neighborhood organizations, shops and agencies are now left unused and some have become burdens. It seems that the threat of nuclear war has been forgotten.

During the current stage of readjustment of the national economy in our nation and the present time when investment in capital construction by the state has been greatly reduced, the civil defense works of each department and each locality and the investment in the various underground structures should also be allowed to develop their function. The projects invested by a foactory for capital construction must quickly begin production after completion and the gain of investment should be examined. Why should the gain of investment of civil defense projects that are large in scale, that require a lot of investment and that are everywhere not be examined? The scale of some underground projects is very large. I once participated in the building of a certain underground construction project. The cost of this project is sufficient to build a new university or a large modern hospital. But such a huge construction project is buried underground today. Has it produced any gain from investment or even been utilized? I do not know. If a newly completed university or a large hospital is left unused for a long time, many people will have a lot to say. But these large-scale underground structures, even if they are left unused for 8 to 10 years, will not attract the attention they should attract.

I believe that as long as we liberate ideology and face reality, we can unwrap the package and change waste into treasure. The experience from the Wuyang underground restaurant to the utilization of civil defense structures for an underground thermostat controlled laboratory shows that "the utilization of civil defense structures in peacetime has a bright future." Civil defense works not only can serve consumers during peacetime, they can also serve the various professions of scientific research, production, medial treatment, storage and shipping. Maybe somebody will think that civil defense works are classified works and when they are used during peacetime, secrecy will be violated. But will the secret be kept if they are not used during peacetime? Is it true that the secrecy will be violated as soon as they are used? Being secret or not is relative.

Although it is necessary to rebuild and utilize civil defense works according to the principle of combining their peacetime and wartime uses, can we realize this technically and investment-wise? If we admit that we have solved the two major problems of water-proofing and air conditioning, civil defense works can be commonly utilized. Then, technical preparations and investment problems will be problems for the state to arrange uniformly.

We know from many domestic and foreign reports that they not only use underground structures as important means of strategic air raid shelters, they also use underground structures as a direction to explore urban development. Because of the ever increasing shortage of urban land, cities must develop towards three dimensional space. One is towards the sky and one is underground. Underground development avoids branching, interference and pollution and can prepare for war and resist earthquakes. Underground structures have their special uses. In Japan's major cities, Tokyo and Osaka, underground streets, undergroud subway stations, underground shops, underground multistoried buildings have emerged following the subway. American architects are also studying underground living quarters. Underground warehouses, underground oil tanks, underground nuclear power stations, underground communications hubs exist in every country. Our nation's underground structures have the longest history. From ancient underground palaces to the living quarters in caverns still used today in the northwest loess regions are all cultural relics of our nation. The difference is that foreign underground structures are modern. And being modern means having air conditioning and ventilation and a high standard of electrical appliances and mechanization.

The key to large-scale underground buildings is to solve the problems of air conditioning and ventilation, lighting, water-proofing and drainage. These require a lot of money and consume a lot of electricity. These are the reasons that underground buildings still cannot be popularized en masse. It is not practical for our nation, with a very low economic level, to do what others are doing. But the question I am talking about is the utilization of currently existing civil defense works and the various types of tunnels and warehouses and such underground structures. Regardless of whether we should have built so many and such large underground projects in the past, since we have done so and spent so much money, not using them would be even a greater waste? Of course, these projects can only be said to have been

generally completed or have mostly been completed in civil engineering work. Most of them do not have any installed facilities or interior decorations. Let us imagine that if we can use the underground structures that have been completed 80 percent investment-wise by spending another 20 percent, then the added investment is worth it.

At present, the machinery processing industry is being readjusted and is temporarily in a state of recession. Why can't they change their production to supplying air conditioning equipment specifically for use in underground projects? If the whole nation's civil defense works and various underground structures are utilized, maybe we can recover a fairly large portion of the investment gain.

Besides perfecting state investment, we must also depend on self reliance of each locality and each unit to perfect these civil defense projects so that they can be used. In the past, each unit relied on its own strength to basically complete the civil engineering work. Today, air conditioning equipment and water-proof materials should be used to arm and perfect these structures. Concerned departments of the nation should uniformly establish plans for peacetime utilization, provide technical guidance, concrete help and equipment.

The above discussion was on how to utilize the small experience of using a civil defense structure to build an underground thermostat controlled laboratory, not because it had any new or ultrahigh technology to offer and not because it was any major invention, perhaps other units have already done so. But our practice explains one viewpoint: "Civil defense works can be applied in production and scientific research. More sophisticated underground structures can also be built by relying on our own efforts. Civil defense works can be widely utilized." The underground thermostat controlled laboratory was built by unknown people who lacked experience. The workers, technicians of the factory and the old masters of the First Construction team of Haizhu Prefecture developed the design, carried out construction and installed the equipment, even the exploratory test manufacturing of the vermiculite asphalt panels. Because we are determined not to let the achievements of our own labor go to sleep underground, we are determined to let our achievements serve the improvement of product quality. We learned when we did not understand, we explored continuously and summarized the experience when we did not have any experience, we studied together, and we created a new experience. Finally, we relied on our own strength to build it. Eight years of use prove that it is basically successful. Since this group of unknown people can do such a task, then sister units that have the experience and sister units that are strong technically can completely utilize their own civil defense works. This is one of the viewpoints that this article wants to discuss.

Several Suggestions and Discussion

The utilization of civil defense works and various types of underground structures during peacetime should also "develop the advantages and avoid the shortcomings" and "be subject to unified planning." The advantage of

underground structures is that they are safe and reliable, the temperature is stable, the ability to resist interference is strong and the ability to resist earthquakes is strong. Underground structures are good places to build warehouses, laboratories, communications hubs and atomic power stations that have special requirements and they are good places to build air conditioned chambers for production, scientific research, medical treatment that require constant temperature and constant humidity. The shortcomings of underground structures is that construction cost is high, consumption of electricity is high when used during peacetime, and man is not accustomed to work there for long periods. It is not easy to solve the problem of air conditioning in large tunnels and warehouses with a large space. It is not practical at present to reinvest in building a large number of underground structures. But currently available underground structures that have already been completed or are near completion should and can be perfected, equipment should and can be installed and they should and can be used. The most urgent and most suitable projects that can be carried out in peacetime, I believe, should be the following:

1. Utilize Various Types of Tunnels, Storage Spaces and Civil Defense Works and Convert Them to Various Types of Granaries and Modern Granaries

Our nation is a nation with a population of 1 billion. To prepare for war, prepare against disasters, and to store necessary food grains are a long-range strategic measure. But viewing the current granaries, we see that the storage techniques are backward and the storage space is insufficient. The grains consumed by urban residents are last year's and even of several years ago. Frequently the grains have changed color and texture and have even rotted. The surface of spoiled food grains have aspergillin flavus and such carcinogenic substances. The residents of Guangzhou City have complained a lot about the quality of food grains. At present, the food grain shops mill the rice into white rice for clients. After such treatment, the amount of harmful impurities can be reduced, but the vitamins in white rice are also lost, and this actually reduces the amount of rationed grains for residents. In cities that consume flour as the staple food in the north, there is no way of knowing whether the food grains have spoiled or not, and continuing in this way will surely be harmful to people's health. This is a major problem concerning the personal benefits of 1 billion people. This must be grasped by the food grains departments and health departments. Capital construction planning departments should also consider investing in the building of some modern granaries. At a time when the present economy is suffering difficulties, it is difficult to build large numbers of granaries. Besides improving currently available granaries, we can also consider converting some civilian or military tunnels and storage spaces into state granaries or central granaries of each province and city. Many huge tunnels and storage spaces have a large capacity and transportation conditions are good. They are safe and realiable, and their use in peacetime and wartime can be combined. Some are large enough for motor vehicles to enter, some can be house machine transport equipment. But how should air conditioning be installed in these tunnels and warehouses is a scientific research subject and it is not a question that can be compared to that for a small thermostat controlled room.

On the other hand, every unit and every region has civil defense works or underground warehouses of different sizes. If these units or regions can install air conditioners in them, the state can consider storing some food grains in the buildings of such agencies, schools and factories. Large amounts of food grains can also be stored at airports, sea ports and military bases under the care of troops.

2. The Various Underground Structures Can Be Converted to Cold Storage Warehouses and Air Conditioned Warehouses for Supplementary Foods

The shortage and imbalanced supply of supplementary foods in cities constitute one of the four major urban problems. This concerns the benefits of thousands of families and tens of thousands of families and the enthusiasm of workers. It also concerns social stability and unity. The supply of supplementary foods and the storage capacity of warehouses for supplementary foods are directly related. Supplementary foods shipped from the farm villages by state-run commercial units frequently become spoiled when they reach the cities. During harvesting seasons, there is a large surplus of farm products and the waste is large. During shortages, floods or drought, there will be a shortage of supply of sideline foods in cities. If the cities and towns all have sufficient cold storage warehouses or many air conditioned warehouses for supplementary foods, the question will be solved much more easily.

Utilizing various types of civil defense works in cities and converting them into cold storage warehouses and air conditioned supplementary food warehouses are more urgent and have more practical significance than those Wuyang underground ice cream shops.

3. Factories and Enterprises, Schools, Hospitals, Scientific Research Units and Troops Can All Utilize Civil Defense Works of Their Own Units and Convert Them into Various Kinds of Special Purpose Thermostat Controlled Rooms, Air Conditioned Laboratories and Air Conditioned Underground Warehouses. Agricultural Units Can Use Them as Underground Nurseries.

As long as we emphasize the peacetime utilization of civil defense structures, as long as everyone thinks, there will be many more special uses. After civil defense structures have been converted to buildings for various uses, will they lose their ability to serve their purpose during war? I believe this is not so. Conversely, if they are not utilized in peacetime, if they are not maintained and preserved, and if they are allowed to collect water and nurture mosquitoes like fetid sewers, then who would be willing to enter them during war? Peacetime utilization and wartime use must be uniformly designed and planned.

4. The Key to the Widespread Utilization of Civil Defense Works Is To Solve the Problems of Dampness and Ventilation. The Main Technical Measures Are: First, Water-proofing and Drainage; Second, Air Conditioning; Third, Appropriate Interior Decoration.

The state must study the production of low cost superior quality and highly efficient air conditioners and efffective water-proof materials. It must conduct a general survey of underground civil defense works at each locality and of each system to make an overall plan for utilization, appropriately provide additional investment for installing equipment and interior decoration so that they can be used, and provide technical guidance to each locality. When the two main problems of air conditioning and water-proofing are solved, maybe several hundred thousand or several million square meters of underground structures could be utilized. At that time, the consumption of electricity will increase. Therefore, energy conservation of air conditioners will become a major subject. Foreign nations are studying the utilization of solar energy for air conditioning and heating. Jiangsu Province also test produced some solar energy air conditioners. If solar energy air conditioners suitable for use underground can be produced, then there will be a breakthrough in the widespread utilization of civil defense works. Thus, the development of air conditioners involves two aspects. One is high-power air conditioners with a large output suitable for tunnels and warehouses. The second is cheap solar energy air conditioners suitable for small capacities. The first can be used in large granaries and the latter can be broadly used in small civil defense structures. The development of air conditioners and water-proof materials are two major technical problems in making breakthroughs in underground construction and engineering. The state should include them as key scientific research subjects.

In the past, cases of utilization of civil defense works have been reported in the newspapers and movies. Propaganda, introduction and popularization are necessary, but if this is to be implemented, it should be grasped in an overall manner in planning, investment, equipment and materials, organization and technology. If efforts to complete and utilize civil defense works are carried out like efforts in building houses, then I deeply believe the several billion investment in civil defense will realize gains.

Due to limited knowledge, the views discussed may not be right. Critisism is welcomed.

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DISTRIBUTION OF INDUSTRY, FACTORY SITING ANALYZED

Shenyang LIAONING DAXUE XUEBAO [JOURNAL OF LIAONING UNIVERSITY] in Chinese No 2, 1982 pp 24-28

[Article by Chen Dongsheng [7115 2767 3932]: "Industrial Distribution and the Siting of Plants"]

[Text] In the process of socialist modernization, rational spatial organization and planned distribution of industry in terms of the various factors involved in social production and reproduction is a problem of all-embracing, long-term significance and of strategic importance. If we do not think in terms of the long term and consider the whole picture in dealing with this problem, but only consider immediate convenience and fragmentary aspects, we will not be able to solve it effectively. For industrial distribution to be comprehensive, systematic and oriented towards the long term, the work of developing guidelines for industrial distribution must make use of systematic planning methods: first the overall strategic disposition of the entire country's industry must be organized and then, under control of the macroscopic situation, the operational and tactical aspects must be dealt with. The problem of the strategic disposition of industry has been the subject of a preliminary analysis in the author's article "Some Problems of Geographical Disposition of Industry";[1] the present article deals only with the local disposition of industry and with plant siting.

1. Rational Disposition of Plants and the Proper Scale for Industrial Cities

Local disposition of industry is the intermediate link in overall industrial disposition, whose main tasks include selecting plant construction sites and determining the proper scale for industrial cities.

The objective of plant site selection in economic terms is to minimize an enterprise's total standardized expenditure for production consumption, i.e., to minimize the sum of labor expenditures and funds outlays in the direct production process, labor costs, and funds outlays on raw and other materials, fuels and power and the entire circulation process, including transportation and product arrival costs.[2]

Because different branches and different products have a different structure of total standardized expenditures, and because the natural and economic

characteristics and processing characteristics of different products and materials differ, there is wide variety in the types of production sites which can minimize total standardized expenditures. The industries engaged in initial processing of agricultural and mining products, such as cotton ginning mills, oil pressing mills, sugar refineries, coal classification plants, ore beneficiation plants and the like, tend to be close to the source of production of their starting materials because the processing of these products involves the greatest decrease in weight of the raw materials; the weight of raw material consumed is several times to several tens of times the weight of the finished product; shipping and storage losses of some agricultural raw materials are also rather large. In contrast, plants whose raw materials lose little weight or even gain weight, whose final products are difficult to ship, whose shipping turnover expenditures are high and which cannot easily use cheap pipeline transport generally are sited close to the consumption locations: examples are sulfuric acid plants, glass factories, furniture factories, food products factories, daily-use articles factories, specialized equipment factories and some oil refineries. Many plants in industries which consume large amounts of electricity are sited close to power production bases, and particularly in the vicinity of large hydroelectric power stations which can furnish large amounts of cheap electric power; examples are aluminum, magnesium and titanium refining plants, ferroalloy plants, calcium carbide plants, synthetic fiber plants and the like whose production processes are based on electrolysis or electric heating processes, whose electricity consumption per unit output is high and for which electricity accounts for 20-30 percent, or even more than half, of production costs. These plants are built close to power stations, and the economic advantage gained by decreasing electric power transmission losses generally greatly exceeds expenditures on the transport of raw materials and semifinished products. The plants in labor-intensive industries where funds account for a small proportion of the balance sheet and wage outlays account for the largest proportion of production costs are generally sited in locations where there is a sufficient supply of motive power and the available work force is large. As science and technology progress, various types of precision instruments, computers and other knowledge-intensive, technology-intensive industries will develop rapidly; these plants are mostly sited with reference to conditions for technical cooperation, generally in scientific and technical centers.

The above types of factories can be classified as "raw materials-oriented," "market-oriented (or consumption location-oriented)," "energy-oriented," "labor-oriented," and "technology-oriented." But in selecting a specific site, because the characteristics of the areas in which plants may be located differ and in particular because conditions with regard to raw and other materials, fuels and power, and the locations, distances and transport conditions of consumer markets vary, the question of where to locate a plant so as to achieve the best economic results after it is completed and goes into production must be dealt with by many-sided technical and economic calculations and comparisons.

Plant site selection under the socialist system not only must assure optimal operating results for the enterprise, but also must guarantee the interests

of the state and society. This includes considerations of national security and environmental and ecological balance. During a certain period in the past, because of the oversimplified, one-sided, absolute attitude of "turning consumer cities into producer cities," refining, chemical and other heavily polluting plants were located in such tourist cities as Hangzhou, Suzhou and Guilin, so that their tourism capital of the "best scenery in the world" was seriously damaged. In addition, large-scale industrial development was planned for Beijing, which is the national political center, a scientific, cultural and educational center and a center of international exchange, and in particular many heavy industrial plants which occupied large areas, consumed large amounts of water and energy and were serious polluters were located there; the industrial population accounted for 40 percent of the city's total population, and heavy industry accounted for 64 percent of its total industry, while there were serious shortages in the foodstuffs and printing industries and in service industries. These experiences have taught us that although the locating of plants must be based on calculation of enterprise economic results, it is even more important that the choice of a location be in accord with national city planning policy and the nature and trends of development of the cities in question if one-sidedness is not to result.

The spatial concentration of industrial districts produces cities of differing scale. Is it better for enterprises to be somewhat concentrated or somewhat dispersed? Should the scale of industrial cities be fairly large or fairly small? These are questions which affect not only industry itself, but industrial-agricultural relations, urban-rural relations and national security as well. After summing up the experience of the First Five-Year Plan, Comrade Zhou Enlai stated:

"As regards the problem of the disposition of industry,...our guiding policy is appropriate dispersion and coordination: we oppose the tendencies of excessive concentration and lack of interrelationship."[3]

Industrial enterprises must be suitably concentrated and suitably interrelated: The primary reason is that modern industry is a complex system with division of labor and cooperation, and only by locating interrelated enterprises together can we form integrated production capacities, make comprehensive use of resources and other factors needed for production, and increase economic benefits. Second, modern industry must be combined with an appropriate production and social infrastructure[4] in order for its capabilities and efficiency to be fully utilized. Only with an appropriate concentration of enterprise siting is it possible to build a unified, rather complete infrastructure, save on investment in the infrastructure and achieve a high utility effect from the facilities. Third, appropriate concentration in enterprise siting also can provide a variety of employment possibilities for different types of labor and can help to solve such social problems as marriage between employees.

Since the establishment of New China, our country has newly-constructed or expanded some industrial enterprises in cities with an existing base for industry such as Shanghai, Tianjin, Shenyang and Wuhan; when we began to build new cities in localities such as Lanzhou, Loyang, Baotou and Chichihar,

where the existing industrial base was weak or nonexistent, we also included some non-production construction projects, and subsequently we also built on the existing base by adding some industrial construction projects. Overall, the results were rather good. Because of the interference and sabotage of the Lin Biao counterrevolutionary clique, the "three line" [San Xian 0005 4848] construction projects of all sizes begun in the middle 1960's were all "in the mountains, scattered and in caves" no matter what their industrial character was; not only interrelated enterprises but even complete plants were fragmented and distributed through mountain valleys located several kilometers or even tens of kilometers apart. Industry siting was too dispersed, and some individual plants or even shops could not construct their own set of out-of-plant facilities and domestic service installations; in-plant and out-of-plant service mains were extremely long, and the amount of construction work required was greatly increased, so that the investment per unit of productive capacity was 50 to 100 percent higher than for other plants of the same kind, in addition to which the construction cycle was greatly prolonged. After the enterprises went into production, internal and external cooperation was difficult. For a long time it was difficult to develop small cities with relatively good domestic service facilities, so that the enterprises themselves had to run all manner of social services, and the leadership's energies were dissipated in a great many directions; employee living conditions were difficult, creating a great many problems for normal operation and management of the enterprises, and production costs were a third higher or even twice as high as for comparable plants. This positive and negative experience has taught us that appropriate concentration in industrial siting and the "benefits of concentration" are objectively-existing tendencies and facts, and that the point at which the technical and economic connections which various types of industry require for local cooperation and the modern urban public facilities which are needed become economical is an important factor governing the degree of concentration of industrial siting: when this level is not attained, dispersion is excessive.

But it is not true that the greater the degree of concentration the better. In a discussion of the various factors which limit the advantages of large-scale production Lenin pointed out: "The laws governing the superiority of large-scale production are not as simple or as absolute as some people think; in industry, it is only 'with other things being equal' (which is by no means common in real life) that we can assure that this law will apply fully."[5] Similarly, the superiority of industrial concentration too is subject to many constraints, and when industrial siting is concentrated in excess of objective conditions many deficiencies will result, chief among which are the following: 1. The requirements for various raw and other materials will be greatly increased, transport distances for materials and products will be lengthened, and labor expenditures in the circulation process will be increased. 2. The resulting concentration of urban population will create a large demand for various agricultural sideline products, and industrial concentration will make it necessary to take over large amounts of farmland, decreasing the amount of agricultural land available in the city and suburbs. Under our country's current conditions, with low agricultural labor productivity and low commodity rates, when the scale of industrial cities is too large the difficulty in providing them with agricultural sideline products

will be increased. 3. Water use for daily life and production is greatly increased, and when local water sources are insufficient, new sources are developed and the water is piped over long distances: a water engineering project generally costs several hundred million yuan. The problem is even more pressing in the northern part of our country where water is scarce. Concentrated discharge of large amounts of production and living wastes produces environmental pollution and damages the ecological balance, and there is some lowering of the potential for using the environment's self-purification capacities to purify wastes, so that in order to maintain environmental quality it is necessary to invest large sums of money in building man-made purification and treatment facilities, which increases environmental protection expenditures. When the total "external costs" of industrial concentration (also called "social costs") exceed the economic benefit of resulting from production concentration, overall economic results fall, indicating that industrial concentration has exceeded the economically rational limit.

To summarize the foregoing, the rational scale and degree of concentration for every industrial base and city is determined on the one hand by the scale of the various component enterprises, the requirements for production cooperation, and their position nationally and in the locality in question, while on the other hand it is also determined by the area's land and water resources, the environmental capacity and the level of development of agriculture in the city and the suburbs. Overall, industrial bases also follow the historical cycle of concentration-dispersion-reconcentration-redispersion. The industry of a given country or area initially starts with a few industrial bases. Once an industrial base is established it exercises a great attraction for other planned enterprises, because building a plant in an existing industrial base makes it possible to take advantage of the existing infrastructure, thus achieving a faster pace of construction, and saving investment on complementary facilities; in addition, when the enterprise is completed it becomes possible to use existing cooperative networks in production technology, to raise the level of specialization and to decrease production costs. As many subsequent projects enter the existing production base in order to avail themselves of the advantages of concentration the scale of the city increases steadily and the faults of excessive concentration gradually emerge, with the result that the advantages of concentration are offset by the external costs produced by overconcentration, industrial construction begins to sense a requirement for dispersion to new industrial bases, and the transport, electr[illegible]nd other networks extend out from the existing industrial base, provi[illegible]he material basis for the construction of new industrial bases. When new industrial bases are built, they pass through a process of development similar to that for the older bases, with the result that new groups of industrial bases appear. In socialist and capitalist countries alike the industrial bases generally develop in this wavelike fashion. The difference is that in capitalist countries this process is subject to spontaneous regulation by the law of value, particularly through such phenomena of the market mechanism as explosive rises in urban land prices and increases in wages, and even if the governments of capitalist countries use administrative, legal or economic measures to intervene in this process,

this does not alter its nature as spontaneous regulation. In socialist production, with public ownership of the means of production and planned development of the national economy, in order to consciously bring about appropriate concentration and dispersion of industrial distribution, when the advantages of concentration may be utilized in existing industrial regions, premature development of new industrial locations can be avoided, but when external costs have exceeded the advantages of concentration in existing industrial locations it is possible to lay out new industrial bases at the proper time so as to allow expansion.

A source of our country's current situation is that many large cities, particularly the very large cities with populations of over a million, have continually taken the approach of "expand if the water supply is sufficient and expand the water supply if the area is large" during the last 30-odd years, and their expansion has been continuous; in addition the city governments have long been behind and in [non-production] construction, public facilities are overloaded, transport, water, land and housing are extremely scare inside and outside the cities, and there is relatively severe environmental pollution. In the future, when new facilities are built, particularly large-scale projects, they should not be located in these cities; if the facilities have close technical interrelationships and must be located in large cities, they should be located in satellite cities in the suburbs; in addition, certain factories in existing large cities with large transport volume, occupying large areas, which consume large amounts of energy and water and create large amounts of pollution should, in accordance with industrial reorganization and the readjustment of the enterprise organizational structure, be gradually moved in planned fashion to satellite districts or other areas. Certain medium and small cities with populations less than 500,000, most of which are the economic centers of their areas, which have relatively convenient transport facilities and a certain production technology, industrial cooperation and operations management base and which lack the various weaknesses resultinf from the expansion of large cities, have great potential for future development; and certain industrial construction projects which are suited to the character of these cities may be placed in them. The experience of such medium and small-sized cities as Nontong, Changzhou and Shashi, which rank high in industrial production performance, provides strong supporting argument. In addition to some 200 major cities, there are more than 3,000 small cities and more than 50,000 rural population centers in commune areas which have close ties with the surrounding countryside and are located in the economic center of the most basic stratum of the countryside. If these small cities' industry and handicraft industry, particularly agricultural products processing industries and agricultural-use products industries suited to local processing were developed in a planned, systematic fashion, production would be located close to both raw material scurces and consumption areas, and it would be possible to provide local employment for the large numbers of workers who were released when agricultural labor productivity increased and to make better use of the ability of small cities to serve as advanced bases for changing the face of the countryside nationwide. However, one thing that must be stressed is that many localities in the southern part of the country have plentiful water resources but are energy-poor, while many localities in the north are well endowed with energy but are relatively short of water.

This characteristic must be taken into account in locating industry and in determining the size of cities and the direction and structure of their industrial development; every effort must be made to take advantage of strong points and avoid weak points.

2. Siting and Layout of Industrial Enterprise Within Cities

Factory siting is the most basic link in industrial disposition and is the precondition for overall layout within the plant. The main tasks involved are choosing the construction area, specific location and orientation of each building within the area (or city) selected for the plant. In terms of the plant, this task is that of siting; in terms of the various buildings, it is layout.

Site selection is subject to two basic requirements. First, it must meet the basic prerequisites for the projected plant's production facility construction and employee living conditions, and second, it must not be a nuisance of its neighbors, affecting or harming the surroundings or the city in which it is located or the environment or landscape of its watershed, but must promote overall planned development of the city or industrial district in which it is located. As regards satisfying the prerequisites for production facilities construction, the proposed plant siting should meet the following basic requirements.

1. The area and topography of the plant grounds must be able to accommodate the factory buildings and installations and must be suitable for a layout of factory buildings and installations that will support a scientifically designed industrial production process.

2. The premises must be level and slightly inclined (generally not more than an 0.5 to 1 percent grade) to decrease site leveling operations and facilitate drainage.

3. To the extent possible the location should be in an area where engineering geological and hydrological conditions are good. The load-bearing capacity of the soil must meet the requirements of the proposed plant, and it must not be sited on faults, karst areas, mobile sand strata or areas above usable mineral deposits, underground water supplies or worked-out mine pits, or in slide areas. If possible the water table below the site should be below the base level of the building foundations.

4. The site should be as close as possible to water supplies and should be suitable for wastewater drainage and treatment.

5. Plants for which special railroad lines must be built should be located as close as possible to existing rail lines and be conveniently located for connections to the nearest station.

6. The site should be convenient for electric and heat supply and the provision of other cooperative facilities.

Because an industrial enterprise is only one of the material factors in a city, only if it is closely integrated with the city's other material factors, such as municipal communications and transport, water supply and drainage, motive power supply, housing and domestic facilities, commercial services and other systems can it function normally. Accordingly, plant site selection and the distribution of industrial enterprises through the city as a whole must not be based solely on the prerequisites of the enterprise's production facilities construction, but, more importantly, must be considered in terms of an overall plan, with suitable handling of the interconnections and conflicts between industry and other urban factors so as to attain optimum results in overall coordination of the layout of the city and assure that it makes a contribution to the construction of a city of the socialist type with a high level of material and spiritual culture and environmental beauty. This is the fundamental difference between plant siting under the socialist system and "optimal site selection" under the capitalist system. Thus, the distribution of industrial enterprises through the city and plant site selection should in the first place be subordinate to the requirements of functional zoning of the city, and enterprises should be classified in terms of the amount of space they take up, their transport volume, their degree of pollution and the like. Small-size, low-transport-volume (not requiring the construction of special rail lines), nonpolluting or slightly-polluting enterprises such as foodstuffs, clothing, printing, precision instrument and other enterprises can be located in independent industrial districts close to or inside the city proper; medium-size machine-building plants, textile plants and the like can be sited in special industrial areas close to the city; while enterprises which take up large areas, have high transport volume and produce serious pollution such as large-scale metal smelting plants, petrochemical plants, heavy machinery plants and the like must be located in special industrial areas or satellite cities rather far from the city area. Industrial districts and enterprises which pollute the environment should be located downwind and downstream of the cities and a certain distance maintained from residential areas, scenic and recreation areas and water sources. As regards city land use zoning, the areas closest to land and water transport routes and those which are convenient for special rail connections should be reserved for various high-transport-volume enterprises (such as large-sized metal smelters, heavy machinery plants and the like); areas which are closest to water resources and are most convenient in terms of water supply should be reserved for various high-water-use enterprises (such as paper mills, chemical engineering plants and the like); locations closest to thermal power stations and suitable for steam supply should be reserved for enterprises using large amounts of steam (such as printing and dyeing mills, plywood mills and the like). In addition, as far as possible, industrial enterprises inside cities should be located according to the "grouping" principle so as to avoid uniform coverage of the entire area or highly dispersed siting. This makes it possible not only to prevent pollution of the urban requirement and damage to the scenic landscape, but also to greatly increase the effectiveness of industrial production facilities construction. The main features of grouped layout are as follows: 1. If enterprises which require continuous processing of the main raw materials, such as sintering plants, coking plants, iron and steel works and rolling mills, are grouped, transport distances for semifinished products can be

decreased, and it will be possible to carry on continuous hot loading and to decrease energy consumption. 2. Grouped siting of specialized industries whose products, parts and processes are closely associated, such as smelting equipment plants, mining equipment plants, heavy machine tool plants, metal structures plants and the like, and the construction of establishment of heavy machine building industry districts, make it possible to set up unified casting and forging centers, equipment maintenance and repair centers and similar technical support areas, to increase the level of industrial specialization, and to save on construction investments and decrease product costs. Also in this category are groupings consisting of complete-assembly plants for certain products, plants supplying various parts and assemblies, and special plants which produce various set-component equipment (such as power equipment industry districts composed of boiler plants, steam turbine plants, generator plants and the like). 3. Grouping of enterprises which make comprehensive use of fuel, motive power, byproducts and wastes, such as fossil-fired electric power stations and construction materials plants, aluminum-oxygne plants and cement plants, metal smelters using various sulfide ores) and sulfuric acid plants, oil refineries and petrochemical plants, and wood processing plants and wood-based chemical engineering plants, promotes economically efficient, thorough utilization of various raw materials and "conversion of harmful substances into beneficial and valuable ones." For example, an aluminum-oxygen plant with an output of 300,000 tons a year discharges as much as 600,000 to 1.2 million tons of red sludge annually. A coal-fired electric power station with an installed capacity of 200,000 kW discharges more than 10,000 tons of coal ash a year. Such solid industrial waste as red sludge and coal ash is not economical to transport, but nearby cement, brick and other building materials plants can make thorough, comprehensive utilization of it. If the various types of industries mentioned above are placed in groups, they also provide conditions for the centralized construction and use of various types of public facilities (motive power, transport, water supply and drainage, production services and the like). Centralized construction of public facilities generally can save half of the investment that would be required if the plants built them separately.

During the First Five-Year Plan period, the industrial siting centering on the large-scale industrial construction project No 156 was closely integrated with regional and city plants and stressed functional zoning and the use of grouped siting, and experience has proved that the results for both industrial production facilities construction and municipal development have been rather good. After the late 1950's, regional planning was suspended and municipal plans and management work were greatly cut back. Municipal industrial layout and overall city construction fell for a time into a chaotic state in which functional zoning was rejected and some plants which produced serious waste and pollution were even built upwind and upstread of cities or squeezed in wherever possible in residential areas, creating a situation in which industrial areas, residential areas, research and teaching areas and scenic and recreational areas were chaotically intermingled. Many enterprises built separate public facilities, with "one water supply line for each plant, one power station for each plant," which degraded the city environment, damaged the city's scenery and layout and was harmful to the development of industry itself. In the future, not only will new construction projects and large

reconstruction and expansion projects be required to follow strictly the requirements of overall urban plans in terms of siting, but existing enterprises which produce large amounts of waste products and pollutants and which create noise and vibration nuisances, will be required to retool, shut down or move in connection with the readjustment and reorganization of industry and the remaking of the cities.

To summarize, in order to improve industrial layout and site selection we urgently need to restore regional planning, strengthen city planning and improve the scientific standards of planning work. This is an important matter which affects the construction of new model socialist cities with advanced material and spiritual culture and beautiful surroundings, and we must study it conscientiously.

FOOTNOTES

1. See "ZHONGZHOU XUEKAN No 2, 1981.

2. The "total standard expenditure" is equal to product production expenditure + product circulation expenditure + (amoung of production and circulating funds used X average use rate or standard capital construction expenditure efficiency coefficient).

3. "Report on Construction of the Second Five-Year Plan to Develop the National Economy," Renmin Publishers, 1956, p 48.

4. The infrastructure refers to the totality of things that service the basic industrial and agricultural production departments. The production infrastructure includes: transport, commodity storage, stockpiles and supply, public motive power, water supply and drainage, waste purification and other systems; the social infrastructure includes: communications, scientific and economic information, research and technical services, general education, special education, worker craining, health care, rest and other systems.

5. Complete Works of Lenin, Vol 4, p 101.

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APPLYING POLICY ANALYSIS TO PROMOTE PRODUCTS OF S&T

Tianjin KEXUEXUE YU KEXUE JISHU GUANLI [SCIENOLOGY AND MANAGEMENT OF SCIENCE AND TECHNOLOGY] in Chinese No 5, 20 Oct 81, pp 20-23

[Article by Zhang Zhenzhong [1728 2182 0022] of the Ministry of Telecommunications Institute No 3: "Analytical Decision Method for the Expansion of S&T Results"]

[Text] Expansion of S&T results is a management task in S&T as well as in the economy. American economist H. A. Simon believes that "management is policy-making" and "the key to management is policy." Indeed, policy is essential in the management of promoting S&T results. One of the important factors in this policy decision is the sense of benefit and loss after the expansion of S&T results. A method of policy analysis is needed by the policy-maker to decide on the most beneficial proposal. In this article we shall discuss the method of policy analysis in the promotion of S&T results, based on our actual experience in promoting the model HRZ-1 automatic body weight scale developed by the Ministry of Telecommunications Institute No 3.

I. Probability Prediction in the Promotion of Results

Every scientific and technological project has a goal, i.e., the technological, economic and social effects to be achieved by the project. In order to reach the anticipated goal, there must be a consistent signal from beginning to end in the expansion of S&T results. Management personnel can then secure this signal and make timely analysis to speed up the decision process and to effectively control and direct the task of S&T promotion.

When publicly displayed, the HRZ-1 machine is quite popular and the technological and economic results are both satisfactory. The profit margin is approximately 50 percent and the capital recovery period is about 1 year (on average in the Shanghai area). Whether this product should be promoted depends on more than these data; instead, probability prediction (or market prediction) should be conducted on the basis of these data.

In 1980, we sent out 175 messages to Shanghai municipality and other areas to promote the HRZ-1 (i.e., promotion signals). Three days later we began to receive feedback signals (in the form of letters, telephone calls and visits);

for a period of 1.5 months, there were feedback signals almost every day, a total of 53 responses.

A breakdown on the feedback signal is shown in Table 1.

Table 1

Index Number	Nature of Feedback Signal	Quantity	Percentage
1	Signing contract	9	16.98
2	Price quote	34	64.15
3	Not intended to order	1	1.89
4	Price too high	3	5.66
5	Private order inquiry	3	5.66
6	Product inquiry follow-up	3	5.66
7	TOTAL	58	100

Suppose we term feedback signals No 1, 2, 5 and 6 in Table 1 as beneficial feedback, and signals No 3 and 4 as nonbeneficial feedback, and we further define P(A), P(B), P(C) and P(D) as follows:

$$P(A) = \text{Feedback probability} = \frac{\text{Feedback signal}}{\text{Promotion signal}},$$

$$P(B) = \text{Beneficial feedback probability} = \frac{\text{Beneficial feedback signal}}{\text{Promotion signal}},$$

$$P(C) = \text{Probability of benefit} = \frac{\text{Beneficial feedback signal}}{\text{Feedback signal}},$$

$$P(D) = \text{Beneficial decision feedback probability} = \frac{\text{Contract feedback signal}}{\text{Beneficial feedback signal}}.$$

Then, based on the data in Table 1, we find

$$P(A) = \frac{53}{175} = 0.303,$$

$$P(B) = \frac{49}{175} = 0.28,$$

$$P(C) = \frac{49}{53} = 0.925,$$

$$P(D) = \frac{9}{49} = 0.184,$$

The prediction data described above and the numerical values of P(A), P(B), P(C) and P(D) indicate that, after the output of HRZ-1 promotion signals, the feedback signals received in 1.5 months are one-third the total number of promotion signals. This item therefore has promotion probability and has some promotion prospect.

II. Production Policy Analysis in Product Promotion

The key to a small test-production decision (or production decision for short) in product promotion is probability prediction, or the needs and interests of the society. Using the above numerical values of P(A), P(B), P(C) and P(D), we now conduct a decision analysis using the decision diagram.

Parameters used in decision analysis are: the material and machining cost of HRZ-1 is 1,472.58 yuan/unit, labor is 2,845.06/unit and price per unit is 7,000 yuan. Based on current management system and considering the two factors of accounting material and applied labor and work time, decision analysis may be made for two cases.

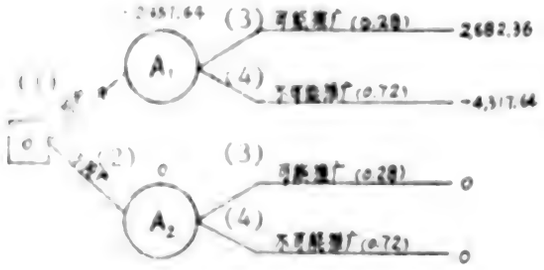
Based on the parameters and probabilities, we can make Table 2.

Table 2

Market Condition	Probability	Decision: Production (yuan)	Decision: Non-production (yuan)
Promotable	0.28	2,682.36	0
Non promotable	0.72	-4,317.64	0

Case 1. Decision analysis for research unit to take work time into account.

According to Table 2, the following decision diagram can be made:



Key:
1. Produce
2. Not to produce
3. Promotable
4. Not promotable

By calculating the profit and loss expectation values

A_1 = 0.28 X 2,682.36 + 0.72 (-4,317.64)

= -2,357.64

A_2 = 0.28 X 0 + 0.72 X 0

= 0

And comparing the profit and loss expectation values at point A_1 and A_2, one can see that not to produce is a more sensible decision.

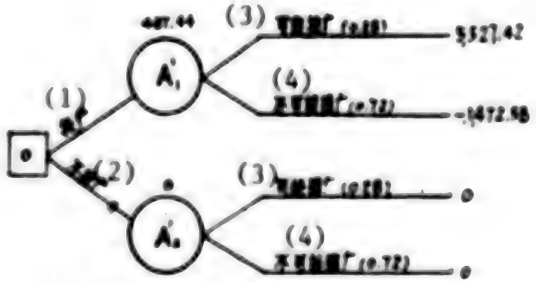
Case 2. Decision analysis for research unit to consider material and applied labor, but not work time condition.

Based on the relevant parameters and probabilities, we have the following Table.

Table 3

Market Situation	Probability	Decision	
		Production (yuan)	Non-production (yuan)
Promotable	0.28	5,527.42	0
Nonpromotable	0.72	-1,472.58	0

We now make a decision diagram based on Table 3.



Key:

1. Produce
2. Not to produce
3. Promotable
4. Not promotable

By calculating the profit and loss expectation values

$A_1 = 0.28 \times 5,527.42 + 0.72 (-1,472.56)$

$= 487.44$

$A_2 = 0.28 \times o + 0.72 \times 0$

$= 0$

and comparing the expectation values at point A_1 and point A_2, one can see that the decision to produce is more reasonable.

It should be pointed out that, in general, the predicted promotion probability of research results and the computed profit and loss expectation values are not precise. It is therefore often necessary to analyze whether changes in these data affect the choice of the optimum plan. Such analysis is called sensitivity analysis.

We now carry out a sensitivity analysis for the HRZ-1 machine. Suppose P is the promotion probability and 1-P is the probability of being not promotable. Then

$P \times 5,527.42 + (1 - P) (-1,472.58)$

$= 0$

And

$$P = \frac{1,472.58}{7000} = 0.21$$

The value 0.21 is known as the transition probability; when $P > 0.21$, production and promotion is the optimum plan; when $P < 0.21$, the best plan is not to produce or promote. In actual practice, we need to vary the values of probability and profit and loss value within probable error and repeat the calculation several times to see if there are major differences in the obtained expectation value large enough to affect the choice of the optimum plan.

Nevertheless, the production policy in research product promotion cannot be determined mathematically merely based on the magnitude of profit and loss expectation value; it should also be determined by the composition of the feedback signal, study of its effect on production decision, and the perception of the policymaker on profit and loss expectation value.

III. Effects of Feedback Signal on Production Policy Analysis

Analysis of feedback signal has a profound effect on the production decision in the promotion of S&T results. We will now discuss the feedback signal of the HRZ-1 machine.

Figure 1 shows the time dependence of the received feedback signal in the promotion of the HRZ-1 machine. As can be seen, feedback signal f(t) is a function of time variable t and the trend of f(t) is a decreasing one as t increases. Function f(t) has four peak values, $f(t)_{max\ 1}$, $f(t)_{max\ 2}$, $f(t)_{max\ 3}$ and $f(t)_{max\ 4}$ decreases as t increases.

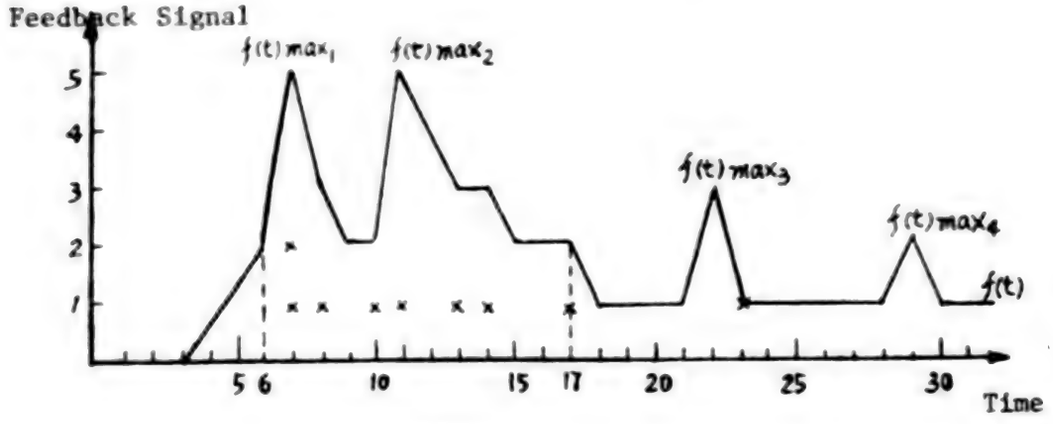


Figure 1.

We believe that an analysis of $f(t)_{max}$, that is, a discussion of the formation of $f(t)_{max}$ and its time dependence, is of great significance in the promotion management of S&T results.

First of all, the formation of $f(t)_{max\ 1}$ and $f(t)_{max\ 2}$ indicated that the output mechanism was sensitive to the promotion signal. However, because of different modes and distances of transmission, the appearance of $f(t)_{max\ 1}$ and $f(t)_{max\ 2}$ occurred at different times. The formation of $f(t)_{max\ 1}$ obviously indicated a short transmission distance and simple transmission mode for the feedback signal. In fact, these signals were mostly sent back from within the city. The formation of $f(t)_{max\ 2}$ showed a longer transmission distance and a mode that was less convenient. Indeed, these feedback signals were mostly from outside the city.

Both $f(t)_{max\ 1}$ and $f(t)_{max\ 2}$ demonstrated the sensitivity of the feedback signal output mechanism on the promotion signal. The rapid formation of $f(t)_{max\ 1}$ and $f(t)_{max\ 2}$ therefore provided the market basis in the promotion of HRZ-1.

If we call the t = 6-17 days region the sensitive region, then the feedback signals received in this time interval may be called sensitive feedback signal.

Points marked with an "x" in Figure 1 were the earliest feedback signal from contract signallers in the promotion of HRZ-1. So the initial feedback signals from units under contract were mostly sensitive feedback signals. It is therefore most valuable to receive sensitive feedback signals and they must be handled securely and cautiously; no slip-up should be allowed. In addition, the

the relationship between price and economic result must be handled carefully to obtain a satisfactory promotion effect. The statistics showed that 80 percent of the initial signals in the HRZ-1 promotion were sensitive feedback signals.

Next, the formation of $f(t)_{max\ 3}$ showed that there was also a peak in the feedback signal sent out by the feedback output mechanism after it received the promotion signal and deliberated. Figure 1 shows that $f(t)_{max\ 3}$ appeared after 22 days. The appearance of t_3 and the value of t_3 depended on the command system and the repeated deliberation of the decisionmaker in the command system of the feedback output mechanism. This type of feedback signal may be termed deliberated feedback. In the present economic structure and system, there is still a fair amount of deliberated feedback. In treating this type of feedback, measures must be taken to strengthen the promotion signal. One method is to establish a reasonable price and payment scheme; another method is to enlarge the effect of economic results. The idea is to encourage the customers to turn in the favorable direction after they have weighed the promotion signal.

The statistics showed that deliberated feedback made up to 23 percent of the total feedback in the promotion of HRZ-1.

Finally, the appearance of $f(t)_{max\ 4}$ showed the indecision and reservation of the feedback output mechanism toward the promotion. Generally the promotion signal is directly sensed and evaluated before a decision is made on whether to send out feedback signal. This type of feedback is called the conservation type sensitive feedback. The receiving mechanism should keep these signals well stored and periodically monitor and evaluate these signals for possible trends of change.

IV. Conclusions

The production policy decision in the promotion of S&T results is a complex issue and is inseparable from the personal characteristics of the decisionmaker. Necessary conditions for a proper decision by the policymaker include broad knowledge, extensive experience, acute ability to predict, sharp judgment power and the courage to take a chance. The scientific method of policy analysis, on the other hand, uses probability prediction, rigorous study of profit and loss expectation and the structure of sensitive feedback signals, and helps the policymaker to make the most sensible decision by simply, definitively and graphically displaying a variety of possible future situations and their probability, a number of possible plans of action and the possible result of each.

Using policy analysis we have obtained good results in the promotion of HRZ-1. Our experience shows that the study and application of policy analysis method in the promotion of S&T results is a very significant task.

(Edited by Xiao Cheng [2556 3397

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IMPLEMENTATION OF RESEARCH INSTRUMENT MANAGEMENT DISCUSSED

Beijing KEYAN GUANLI [SCIENCE RESEARCH MANAGEMENT] in Chinese No 1, Jan 82 pp 54-59

[Article by Meng Youyi [1322 0645 5030]: "Several Questions in the Practice of Managing Scientific Research Instruments and Materials"*]

[Text] In the progress of the socialist "four modernizations" in China, science research management is investigated as a new field by theorists and by comrades engaged in practical work. Management of research equipment is an important component in the management of science research and is attracting people's attention. It plays an important role in the economic effect of science research and in producing more results and trained personnel.

In this article, we shall discuss the following issues in the scientific management of research equipment.

I. The economic effect of research projects should be examined and research should be carried out according to a code of conduct.

The central mission of research equipment management is to serve scientific research actively and to insure and promote the successful completion of scientific research. Research cannot be done without money and material, but for many years because of the insufficient understanding of science by the people, research mission is often emphasized and instrument and material management often neglected in treating the relationship between research and management. As a result, proper benefits were not derived from the nation's investment on research and equipment management lost its important function of protecting the resources and insuring research progress. The necessity of science management should now be recognized and the situation just described should not be allowed to continue.

*Instruments and materials referred to in this article include instruments, equipments, components and material.

1. Project expenditure must be accounted for and its economic effect must be evaluated

Since the state unconditionally provides research expenses, the following phenomena are prevailing: When a project begins, assignments are made, plans are formulated and reviewed but final target and milestone targets are not discussed and instrument and material expenditure is not accounted for. Some comrades conduct scientific research at any cost in the name of scientific exploration. Projects start with certain purposes but conclude without any result and nobody is keeping record of the expenses. In a word, scientific research is being done everyday but investments are not kept track of, everyone just wants material supply and nobody is controlling the instruments and material. Based on statistical data of the past 20 years at 1 institute, due to repeated changes in project direction and assignment, 1,236 pieces of equipments were wasted at a cost of 3,345,000,000 yuan, other component and material losses are not even included due to the lack of statistical data, so the actual loss figure is much greater. Another institute assumed an assignment in 1971 which was scheduled to be completed within 3 years; now 7 years have passed and there is still no result. Year after year, when the moneys are gone, more money is requested, but if the jobs are not finished, they are pushed to the next year. If one asks how much investments have been made so far, there is no expenditure accounting data, if one asks how much more investments are needed, there is no expenditure accounting target. Obviously these phenomena are closely related to the lack of expenditure accounting and economic evaluation and they do not meet the requirements of scientific management. The situation we just described shows that expenditure accounting is an objective requirement of research equipment management and the evaluation of economic effect is the logical extension of expenditure accounting. In order to examine the economic effect of equipment use, a system of equipment and material possession and usage card should be established. Statistics and system analysis should be conducted from an equipment management point of view so that regularities can be identified and full benefits can be derived from the investment made by the state. In the meantime, evaluation of the economic benefits of project expenditures will also help to appraise the business level and work achievements of the personnel, maintain proper emphases, make optimal investment and promote scientific research in producing results and trained personnel.

2. Scientific research should have a code of conduct

Research equipment and material are our socialist wealth created with the sweat and blood of the Chinese workers. How to treat state property becomes a question of code of conduct. Comrade Mao Zedong pointed out in his 1943 report "Our Economic Policy" that "bribery and waste are extremely serious crimes," and advocated conservation "for the sake of our economic construction." If a code of conduct were put into effect in research equipment management, rules and regulations would become meaningless pieces of paper and serious wastes would results because of irresponsible acts. It would seriously jeopardize the function of equipment management, namely, insuring research progress and protecting state property.

The principle in equipment and material management is that equipment and material supply can be guaranteed only after assignment, plan, proposal and implementation are put on solid basis (known as the "four solid basis" for short). The "four solid basis" principle brings about the scientific nature of practical research and is precisely the scientific attitude of technical workers. The achievements of numerous technical workers have attested to this point without exception. If this scientific principle were not strictly adhered to, the result would be extensive wastes. For example, one project was started twice and terminated twice because it did not have the "four solid basis." As a result, nonstandard experimental equipments were pronounced "dead" in the manufacturing process and the net loss was 540,000 yuan. At one institute where plan and proposal were not put on a solid basis, a 28,000 yuan large equipment purchased in 1972 is still not assembled after 9 years. According to statistical data at 1 institute from 1962 to 1967 and from 1972 to 1980, 373 pieces of branc new equipments valued at 2,433,000 yuan were sent out and processed in the 15 year period because they did not carefully deliberate on their equipment needs.

Some examples cited above showed how serious the waste would be if there were no economic evaluation and code of conduct in scientific research. But these losses were totally unchecked by research equipment management and nobody assumed any responsibility to these losses. It is time to thoroughly change this kind of "waste as you please" situation.

On the issue of practical research, economic evaluation and code of conduct, some people might have different opinions and think that scientific research is an exploratory effort, is it reasonable to make these requests and will it affect the spirit of bold innovation of the researchers? The fact is that, on the contrary, any scientific and technological worker with a serious scientific attitude is meticulous about the practicality of his research and resents unscientific attitude. Scientific exploration follows specific laws of science and has absolutely no common ground with irresponsible blindness. China's successful launch of guided missiles in the Pacific Ocean and the construction of Gezhou dam to intercept the flow of the Changjiang have forcefully demonstrated the scientific exploration attitude of the technical workers. One thing is beyond any doubt, evaluating the economic result of projects and following the code of conduct in research will undoubtedly weed out the wishy washy in the technical ranks. The objective requirements of research equipment management, therefore, forces us to formulate practical and workable rules and regulations based on our own specific situation and combine the interest of the state and the economic interest of the individual and turn them into pressure and a driving force for scientific research.

Overcome the practice of stressing supply and neglecting management and pay attention to economic results

Material supply and equipment usage constitute the management of research equipment and supply. The job of the equipment management department is to provide necessary material support to insure smooth progress of research. The supply of equipment is based on the following considerations: 1. Supply is provided to approved projects, 2. Projects should have the "four solid

"basis," 3. Projects should have expenditure accounting targets, 4. How are the currently available instruments and materials used? 5. Information on foreign equipments, 6. State policies regarding material use. Corresponding to the supply of equipment, there is the management of equipments in use and in storage. The jobs here include evaluating and coordinating equipment application of projects based on the usage and availability of existing equipments and, following the guidelines of equipment supply described above, insuring that equipment in possession and to be supplied will be sensibly used, and striving for the best economic effect to meet the goal of serving scientific research. Therefore, if equipment supply is viewed as the implementation step in research management, then, the management of equipment is the monitoring step. Although "supply" and "management" each has its own work and emphases, they are different and yet related. "Supply contains management" and "management contains supply" are two complementary links in dialectic unification.

For a long time there was a tendency to stress supply (purchasing) and neglect management. When equipments were discussed, it appeared that the only problem is a supply problem. Whatever the laboratory or research group wanted, the equipment department supplied. The function and performance of the equipment management department were evaluated on what they could supply and the economic sensibility of the supply (purchase) was not considered. The 1979 property accounting data of one institute showed that, because of the tendency to stress purchasing and neglect management, 488 equipments with unit prices of 5,000 yuan or higher had an annual utilization rate lower than 50 percent, this represented a total value of 6,475,800 yuan or 58.8 percent of the total equipment expense and 67.6 percent of the total number of equipments. Among those equipments, 157 had a utilization rate less than 25 percent and represented 23.7 percent of the total number of equipments and a total value of 2,728,000 yuan or 24.8 percent of the total equipment expense; 116 had a utilization rate of zero and they represented a cost of 1,887,800 yuan or 17.5 percent of the total equipment number and 17.1 percent of the total equipment expense. The piling up of components was also very serious. The amount of components overstocked costed 800,000 yuan and was 148.2 percent of the storage stock quota. Components checked out from storage and piled up in various laboratories formed a "small storage," 1.43 million yuan of components or 1.64 times the stocked component value were in these small storages. For some components, the amount stored in laboratories was 6.3 times that in storage.

These figures show that, when state capital is used without compensation, it is easy to stress supply (purchasing) and neglect management because of the lack of economic concepts. And it is easy to have the conservative tendency of becoming "small but complete" and "not asking for help." An undesirable situation is therefore formed in which every group does its own purchasing, laboratories do not communicate and components and equipments are piled up everywhere. This phenomenon shows that some of our unit leadership and management departments "are only paying attention to utility value indicator," "have no sense of value" and "paying no attention to quantity value indicator and economic effect" (written presentation by Comrade Sun Yefang [1327 0396

2455] at the forum on economic theory, see 13 April issue of WORLD ECONOMIC REPORT, volume 28, 1981).

To put a stop to the overemphasis of supply and negligence of management and to improve the management of equipment, a major effort must be made to deal with the key issue of economic effect, in addition to ideological and political work. 1. Pay attention to the five essential factors in the economic effect of research equipment management: sophistication of the product, reliability of the quality, suitability of the research, timeliness of supply and demand, and the economic sensibility. Neglecting any of the five factors will affect the scientific management function of insuring research development and developing economic effect. Due to the limitation of space, we shall not further elaborate on these five factors. 2. As to the method of implementation, it should be based on the specific research situation and appropriate economic management method should be chosen. Economic management and administrative instruction should be combined to insure sound economic results. To this end, we should do the following: (1) Include compensation for instruments, equipment and material use in project accounting quota. (2) For general purpose precision instruments or equipments rarely used, they should be shared in use and uniformly or specially managed. Qualified institutes may establish a common-use precision instrument laboratory. A rental method may be adopted for using these precision instruments. (3) Strictly enforce the "four solid basis" principle in supplying equipment and material, closely coordinate the cooperation between research planning management and research instrument management organizations, and closely coordinate the management of equipment supply and equipment use. (4) Equipment management departments should establish special accounting personnel to keep track of storage, equipment use and supply cards, and the utilization rate of instruments. Economic effects of supplying equipments to various projects should be accounted and used as reference for research management policy-making.

Inspection, measurement and maintenance should be stressed

Due to intrinsic and external reasons, there are always precision, wear, and service life problems when the instruments are used. In scientific research the process of purchasing, using, rebuilding or scrapping an instrument is also the process of creating the useful value of an instrument until the useful value vanishes. The longer the better the process in satisfying the requirements of scientific research, and the higher the better in the utilization rate in the process. This is highly significant in insuring a smooth progress of research and it is also related to the economic effect of research investment. It goes without saying that both quantity and quality have to be taken into account whether the management involves equipment supply or instrument usage.

Negligence in inspection, measurement and maintenance are reflected in the following practices: no inspections were made when components go into storage, only quantities are accounted for but not quality, equipment usage is stressed and equipment maintenance is overlooked, inspection and maintenance of mechanical and electrical equipments are almost nonexistent. If an institute has 555 mechanical and electrical equipments (not including meters), and these

equipments cost 3,091,000 yuan, it represents 17.25 percent of the total number of equipment and 19.64 percent of the total equipment value at the institute. For such an enormous property there is no special maintenance crew or any kind of maintenance measure to insure their integrity, precision and technical function. The accuracy of many lathes is rapidly deteriorating to the degree that they can no longer meet the machining requirement due to lack of maintenance and repair. The way other electrical and mechanical instruments are used is "turn on the switch and use it, turn off the switch and leave it," there is never any regular service or repair until the instrument falls apart.

The lack or the absence of inspection and maintenance cause the great losses. This can be seen in the property accounting data of one unit shown below.

Table 1. Property accounting and equipment damage and repair action at a certain institute (Amount in 10,000 yuan)

(1) 年份	(2) 项目	上交仪器设备台数 (3)		损坏待修数 (4)		损坏台数占总台数的百分比(%) (5)		与前一次损坏待修数的递增比(%) (6)	
		台数 (7)	金额 (8)	台数 (7)	金额 (8)	台数 (7)	金额 (8)	台数 (7)	金额 (8)
[illegible]	[illegible]	392	44.56	76	5.46	19.38	12.25		
[illegible]	[illegible]	384	55.44	73	9.94	19	17.93	-4	45.1
[illegible]	[illegible]	379	64.32	90	19.58	23.94	30.35	23.29	96.98
[illegible]	[illegible]	329	87.54	104	37.51	31.61	42.85	15.56	91.57
(9) 总计	[illegible]	1481	252.06	343	72.49	23.16	28.76		

Key:
1. Year
2. Item
3. Total number of equipments
4. Number of equipments damaged awaiting repair
5. Percentage of damaged equipments awaiting repair (%)
6. Percentage change with respect to previous number of damaged equipments
7. Number of equipment
8. Amount (in 10,000 yuan)
9. Total

Table 1 revealed the following two situations regarding damaged equipments:

1. In terms of the average value per equipment: In 1962 the average value was 718 yuan, 1,362 yuan in 1972, 2,176 yuan in 1977 and 3,607 yuan in 1979. If we take into account the price drop of equipments from year to year (from early 1970's to early 1980's, the average price of oscilloscope, digital frequency counter and digital voltmeter has dropped 51.66 percent), there is a clear trend that damaged equipments are more and more precision and expansive equipments.

2. In terms of the percentage change in number and in cost: Inspecting the percentage change from previous number of damaged equipment, the increase in value far exceeds the increase in number. The average increase in value of damage equipment is 77.88 percent whereas the average increase in number of damaged equipment is 11.62 percent. This comparison on the one hand shows that the damage is getting more and more serious and on the other hand the "early retired" equipments are more and more precise and expansive.

The example above pertains to only one institute; if the entire academy of sciences or the entire nation is included in the statistics, we fear the results will be very shocking.

There is an objective need to stress inspection, accounting and maintenance and strengthen the technical force in this area.

1. The need to conserve

The accumulation of our national wealth relies on two sources: increase production and conservation. For example, one institute paid attention to equipment maintenance and repaired 728 pieces of instruments in the period from 1972 to 1977 alone even though the institute had an instrumentation group with only 5 or 6 members and the technical force was also inadequate. These 728 equipments cost 3.18 million yuan, equivalent to 30 percent of the total number of equipments invested by the state at that institute in the last 6 years or 48 percent of the total cost. This shows how important service and repair can be in conservation and potential development.

2. The objective need to adapt to the difference in product quality

In the production of scientific instruments, only the products in Shanghai and several other cities have good quality. Products from other provinces and cities still have a way to go. Therefore, we can compensate and adapt to this objective existing quality problem only by emphasizing maintenance and repair.

3. The need for scientific and technological modernization

Along with the rapid progress in science and technology, instruments are becoming more and more complex and accurate. In the past the malfunction of a simple equipment could be readily fixed, but for today's highly complex and sophisticated instruments, this is no longer an easy task, especially for imported instruments. Therefore we cannot do without a high level of maintenance and repair capability.

4. The need to maintain quality

Earlier we gave an example where the "small stock" of components at an institute is 1.64 times that of the main storage. One of the reasons that caused this situation is that when components go into storage only the quantity was counted but the quality was not inspected. In order to screen the components, the researchers would check out 10 pieces and use only one and hence the

pile-up. If the quality of equipment and material is not checked, it will not only hamper the progress of research but also exhaust the money on low quality products. In the case of inspecting imported foreign products, compensation is also involved. It was pointed out in the State Council and Planning Commission documents presented in the 1974 national conference on imported material that "The question of inspection is a question of how to treat state property and the sweat and blood of the working people."

We propose the following four suggestions based on the current problems and the requirements of scientific research instrument management. Firstly, instrument management departments should have people specifically responsible for inspecting the instruments and components entering the storage. Instruments and parts of inferior quality should not be allowed into the storage. Secondly, based on their own special cases, institutes and research units should establish instrument maintenance crews to provide timely service for general malfunctions and periodic calibration of most of the instruments and maintain sound performance of the equipments. Thirdly, repair plants should be established to solve repair problems of machinery and electrical equipments and major instrument troubles that cannot be solved by individual units. These plants should be enterprises for profit and be responsible for their own economic gains and losses. Fourthly, a technical crew for instrument inspection and repair should be trained by various methods to serve as the technical base for repair plants and to inspect the incoming equipments at instrument management departments.

Research Instrument Information Must Be Taken Seriously

Information data are the eyes and ears of research instrument management, but the information office at many research units do not have equipment information and instrument departments themselves seldom pay any attention to equipment information. Except in a few research units, there is no special staff specifically responsible for information work. In the days of highly developed science and technology, ever-changing new products and increasingly shorter periods between generations of equipments, negligence of equipment information means not knowing the changing situation of the market and the manufacturers, unaware of product quality and unable to predict the trend of development. Lack of equipment information will inevitably lead to blindness in equipment assurance which serves scientific research.

The following phenomena occur time and again: because no one is responsible for gathering equipment information, there is no timely feedback and adjustment and, as a result, extremely poor quality products are repeatedly purchased. These equipments require too frequent repairs to be useful. Due to the lack of ordinary information from foreign manufacturers, equipment accessories are often left out or misordered. The result is delay in research and loss of economic benefit. Particularly in the area of imported foreign equipments, because of the lack of information and because much of the technical information is not translated into Chinese, the scope of usage and the full development of equipment performance are affected; and in some cases this lack of technical information even leads to operation errors. The lesson of the sunken Bohai No 2 drilling rig is caused by negligence of information

and not translating vitally important technical information into Chinese. This grave lesson should put us on our guard.

Experience has shown that attention should be paid to equipment information no matter how much we are concerned with the usage and maintenance of equipment, the economic effect or scientific management.

Stress the Construction of Research Instrument Management Ranks

According to its function in research management, the equipment management department in a research institute belongs to the technology system. But because of the limited scientific awareness of some people, it has been treated customarily as an administrative department. Proper attention has not been paid to the intelligence level and technical specialty of the personnel composition. The present status of the instrument management department is as follows: most of the core members are experienced older comrades engaged in management work for 20 years or more. Although their experience is valuable, they lack the specialty knowledge. Other members belong to the "delayed generation," although most of them are actively learning and improving their ability but they will not meet the requirements of science management in the short term because of their poor educational background. The two generations are separated by 15 to 25 years. Facing this situation, adequate attention must be given to the build-up of an instrument management team.

In the space below we shall analyze the quality of current personnel based on the 1979 statistics of technical personnel in scientific research planning office (office of science and technology) and scientific instrument management office (office of facility) at five research institutes.

Table 2. Percentage of college graduates in accreditated technical personnel of the two functionary management offices at five research units in 1979

Research Unit	科研计划处(科技处) ①				科研器材处(条件处) ②			
	total no.	③	④	%	Total no.	③	④	%
A	10	10	10	100	28	14	2	14.3
B	6	6	6	100	13	5	1	20
C	8	7	6	85.7	20	11	2	18.2
D	6	6	6	100	13	13	3	23.1
E	8	8	8	100	22	10	0	0
Total	38	37	36	97.3	96	53	8	15.1

Note: ① Scientific research planning office (office of science and technology)

② Scientific research instrument office (office of facility)

③ Number of accredited technical personnel

④ Number of college graduates

As can be seen from Table 2, in 4 out of 5 units, 100 percent of the staff of the office of science and technology are college graduates but only 14.3 to 20 percent of the accredited technical staff of the instrument department have college degrees. The number of technical staff in the science office with a higher education is five times that of the instrument office. (Note: Because some of the staff in the instrument office have administrative or worker classification, the personnel composition percentage is not computed based on the total number of staff.)

We are not saying here that without a college degree the work ability is always poor. A rich experience is an important and indispensable factor in the integrity of a science management worker. One cannot do a satisfactory job in instrument management with mere specialty knowledge and no practical experience. By stressing the quality of personnel composition, we are emphasizing the fact that we cannot remain in the condition formed by past history and we must follow the requirement of technical system and assign instrument management people with certain special knowledge. To realize the modernization in science and technology we not only need superior scientific and technological workers on the first line, but also need research instrument managers with special knowledge. We should "produce talents" in scientific research and instrument management talents should not be excluded from it.

It takes more than just a few years to correct the long-term deficiencies in the quality of research instrument management personnel. But it is absolutely necessary to pay attention from now on and to deploy the technological force systematically. We should immediately undertake the task of giving current personnel practical, systematic and specific training.

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SOLUTION TO PROBLEMS OF RESEARCH PROJECTS APPRAISAL URGED

Beijing KEYAN GUANLI [SCIENCE RESEARCH MANAGEMENT] in Chinese No 1, Jan 82 pp 46-49

[Article by Hu Mingyang [5170 0682 3152] of the Dalian Steel Institute: "A Preliminary Study of a Model for the Comprehensive Appraisal of Research Subjects"]

[Text] Scientific research projects are the most fundamental unit of science research. An important problem in research management that must be solved in order to evaluate properly the performance of researchers is the comprehensive appraisal of research projects.

Under usual circumstances research laboratories or plants and enterprises often appraise the research subjects on their own. They might evaluate the research by the summary report and the quality of journal in which the reports are published. Research may also be evaluated by the amount of time and fund it spends, its application results, or by comments such as "advanced domestic level," "filling a void," or "international standard." Although these methods make some sense, they only partially describe the quality of the technical personnel in the vertical direction. They do not give an overall picture of the work and nor do they compare the work quantitatively in the horizontal direction. These methods therefore tend to lead to partial conclusions in the appraisal and may even "cover up the overall low efficiency with outstanding isolated cases."1 At the same time it is also difficult to see how the manpower is being used and who is really doing the work and who is only taking the credit. Hence we must find a quantitative method to evaluate scientific research subjects and establish a model of comprehensive appraisal.

In this article we begin with "project period curve" to build on the concept of "project index," introduce three quantitative indicators "research efficiency," "research quality" and "research expense" and establish a comprehensive appraisal table for the purpose of evaluating the research topics quantitatively.

Project Period Curve

As is well known, any research project takes a certain period of time from proposal to completion and until it is put into production and its application

is promoted. This is usually described by the linear relationship between progress y and time t, or,

$$y = \alpha t$$

where α is the rate of progress of the research project.

In actual cases, however, this linear relationship does not exactly agree with the objective law of development of a project. Generally speaking the development of any objective event, just like the biological growth process, is a complete process consisting of occurence, development, maturity and decay. The rate of development in different stages is not the same. Similarly, the development process of scientific research also has different stages. The progress rate in the preparation stage and in the concluding stage are usually slow and the rate in the development stage is usually faster. The development process of a research project may be described by the s curve in life-simulation.

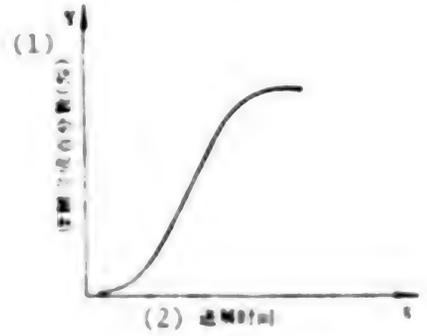

Figure 1. s Curve

Key:
1. Percentage of completion
2. Time elapsed

The s curve in Figure 1 may be written in the following analytical form

$$y = 50\left[\sin\left(\frac{t}{d} - \frac{1}{2}\right)\pi + 1\right] \quad [2] \qquad \ldots\ldots\ldots\ldots\ldots\ldots(1)$$

where y is the percentage of completion, t is the time elapsed and d is the total time required for completion. Obviously the progress of a research project may be treated more accurately using the s curve. But as far as research managers are concerned, they are more interested in the project quantity quantity, that is, the effective work volume of the technical staff. For this purpose, we introduce the concept of "project index." The project index a is used to describe the project quantity in the following manner:

Equation (1) multiplied by a gives the completed quantity of the project at various stages:

$$r = 50a \left[\sin \left(\frac{t}{d} - \frac{1}{2} \right) \pi + 1 \right] \quad \text{.....(2)}$$

In Equation (2) the constant 50 represents 50 percent. For the convenience of computation, we shall write Equation (2) in the following form:

$$r = 0.5a \left[\sin \left(\frac{t}{d} - \frac{1}{2} \right) \pi + 1 \right] \quad \text{.....(3)}$$

Equation (3) is the expression for the project period curve and r is the amount of completed work at a given stage.

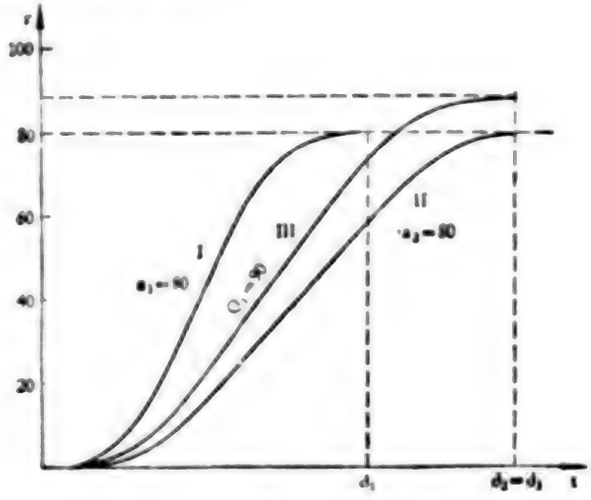

Figure 2. Project period curve

Figure 2 shows the period curve for three projects. The project indices of I and II are equal to 80, indicating that the degree of difficulty (project quantity) for I and II are the same. But because of the different periods ($d_2 > d_1$), the research efficiency of I is obviously higher than that of II, with other factors being equal. The research efficiency of II and III may be analyzed in a similar way. Thus, further study of quantitative appraisal of research may be conducted based on project period curves.

Determination of Fundamental Parameters

In order to carry out a quantitative appraisal of the project, a series of fundamental parameters must be determined based on actual data.

1. Project index a

Project index is the most fundamental parameter in an appraisal. After the project task plan is issued, the project originator (or group leader) is given a certain amount of time to deliberate on the subject and the supervising academic committee shall conduct an evaluation and determine the value of a.

The author suggests the following range for a value, $0 < a \leqslant 100$, and the following 8 items[3] for determining the value a.

(1) Project source

(2) Objective and significance of research

(3) Current status, standard and development trend of the research in question, both domestic and foreign

(4) Principal content, approach and technical method of research

(5) Major milestones, progress and indicator of research

(6) Final goal and time for completion

(7) Composition and specialty of participants

(8) Available resources (manpower and facility) and necessary steps to carry out the research

So, by determining the value of a, the research managers will have a quantitative understanding of the project before it officially begins, and in the meantime, the project undertaker can also have a general idea bout the load he he assumed.

2. Project period d

From the period curve in Figure 2, the area under the curve is essentially the total amount of work completed by the project contractor. By integrating Equation (3), we have

$$R = \int_0^d 0.5a \left[\sin\left(\frac{t}{d} - \frac{1}{2}\right)\pi + 1\right] dt$$

$$= 0.5\,\frac{a}{d}\cos\left(\frac{t}{d} - \frac{1}{2}\pi\right)\Bigg|_0^d + 0.5\,ad$$

$$= 0.5\,ad \qquad \ldots\ldots(4)$$

From Equation (4), d is project period or the actual total time for completing the research subject. Equation (4) shows that the actual amount of work depends on a and d. It should be pointed out that the value of d is not equal to the time needed to complete the project. The value of d depends on the technical level and efficiency of the researchers. Therefore, the actual total amount of work R cannot be used as a basis for evaluation; instead, the evaluation should be made on the basis of the effective amount of work Q. That is,

$$Q = \ldots\ldots(5)$$

where $l = a/(d.f)$ is the research efficiency index and f is the number of participants. Thus,

$$Q = Rl$$

$$= 0.5\,ad \cdot \frac{a}{df} = \frac{0.5a^2}{f}$$

One can therefore see that the effective work volume of the project contractor depends only on the project index and that project period d is an indicator of the efficiency.

3. Project result ω

After a project is completed, an important task of the research manager is the determination of the project result. The determination of research result and the comprehensive appraisal of the research project are not the same thing. It would be biased to replace the comprehensive appraisal of a research project by the evaluation of the research results. It is not always worthwhile to obtain high quality research results by paying a high price and expending a great amount of time. Hence, a research result is only one of the parameters in evaluating the research quality. We represent the research quality index by ω. In the determination of ω, the research institutes should establish a unified standard, much like the product standard used by plants. The author suggests the value of ω to be the range of $0 < \omega \leq 100$ and recommend scientific effect, economic effect and social effect as parameters in determining the value of ω.

4. Cost coefficient k

The cost of a research project must be taken into account in the comprehensive appraisal. In order to do so, the cost coefficient K of a given research institute must first be determined from its historical background and statistical data of the research institute. Then, based on $H = Ka$, project expenses can be computed for different project index, but these would be the projected expenses. After the research is done, the actual expenses are determined according to project expense manual. We use $n = \frac{H}{h} = \frac{Ka}{h}$ to represent the research expense index, where h is the actual expense.

Computation of the comprehensive appraisal table

Using the fundamental parameters described above, we may calculate three quantitative indices in our comprehensive appraisal of research:

1. Research efficiency index l

$$l = \frac{a}{d \cdot f}$$

2. Research quality index m

$$m = \frac{\omega}{a}$$

3. Research expense index n

$$n = \frac{Ka}{b}$$

A comprehensive average value is then computed from l, m, and n:

$$C_p = \frac{l + m + n}{3}$$

We now illustrate this with an example: Given five research projects with project number 80-321, 80-415, 80-614, 80-126, and 80-131, respectively. Here they are referred to as projects 1, 2, 3, 4 and 5. The research expense coefficient of the institute is K = 0.15. The computation of various parameters is given below:

$a_1 = 80$ $a_2 = 90$ $a_3 = 95$ $a_4 = 70$ $a_5 = 80$

$d_1 = 12$(月) $d_2 = 18$(月) $d_3 = 10$(月) $d_4 = 10$(月) $d_5 = 14$(月)

$f_1 = 4$(人) $f_2 = 5$(人) $f_3 = 4$(人) $f_4 = 3$(人) $f_5 = 2$(人)

$\omega_1 = 95$ $\omega_2 = 90$ $\omega_3 = 95$ $\omega_4 = 100$ $\omega_5 = 85$

$b_1 = 2.5$(万元) $b_2 = 3$(万元) $b_3 = 3.2$(万元) $b_4 = 2.8$(万元) $b_5 = 4$(万元)

Key:
1. Months
2. Man
3. In 10,000 yuan

Based on the above parameters, values of l, m, n and C_p are computed and the following comprehensive appraisal table is made.

Comprehensive appraisal table

Project number \ Index	l	m	n	C_p
[illegible]	1.17	1.19	4.8	2.55
[illegible]	1	1	4.5	2.17
[illegible]	2.33	1.17	3.99	2.41
[illegible]	2.33	1.44	3.99	2.59
[illegible]	2.00	1.1	3	2.12

From the table above, we can clearly see that the order of merit of the 5 projects is 80-321, 80-126, 80-614, 80-131, and 80-415. One could also proceed to analyze the strength and deficiency of each project based on these results.

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INCREASED RATE OF RESEARCH RESULTS, APPLIED TO PRODUCTION NEEDED

Beijing KEYAN GUANLI [SCIENCE RESEARCH MANAGEMENT] in Chinese No 1, Jan 82 pp 42-45

[Article by Zhang Qinghe [1728 3237 3109] of the Chinese Institute of Agricultural Mechanization: "Focusing on the Survival Rate of Scientific Research Results"]

[Text] In scientific research one must strive to accomplish the most and the best results with the least amount of expense. This is a principle that should always be adhered to in socialist construction and it is even more important in the readjustment of the national economy.

In order to achieve more results with less money in scientific research, one must take a number of specific actions, one of them is to pay attention to the "survival rate" of research results. What do we mean by the survival rate of research results? In my opinion, the survival rate of research results in applied science is the percentage by which research results are applied to production (and become popular among the users) and turned directly into a productive force.

The importance of the survival rate is obvious. The higher the survival rate, the fewer the "dud" projects. "Dud" projects are a great waste of the nation's limited manpower and financial and material resources.

Let us look at the Ministry of Agricultural Machinery statistics. From 1972 to 1978, there were a total of 340 new agricultural machinery products developed in China, 131, or 39 percent, of these new products were put into production and 160, or 47 percent, were not put into production, and no information was available (presumably not put into production) on 49, or 14 percent. Among the 131 new products put into production, 33 of them were forced to discontinue because of problems such as poor performance, low quality, product not durable, inadequate farm tools to match, product not suitable for the job, and not enough orders and sales. Today only 98 of them are still in production, representing a mere 28.8 percent of the total number of developed products. Granted, scientific research is an exploratory process and there will be successes as well as failures and it may be too much to ask for every product developed to be successfully used. But we still hope that the rate of conversion from research result to direct productive force can be higher.

Project Selection Should Be Based on the Needs

For the nation as a whole, we cannot neglect the research of the basic theory because it is the basis for further improvement of the science and technology standard. But for research units engaged in applied science studies, the main effort should be placed on the development and production of urgently needed items and serve the national economy. This is the primary duty of an applied science research unit.

Production must have an objective basis and in agriculture we must clearly identify the production needs or the production area and the true needs and false needs. Except in special cases, the main thrust of research must be placed on serving the needs of large area production. Some of the problems raised in production appear to be genuine needs at the moment but they may not need immediate solution because some of them are "false needs." For example, interplanting has seemed to be very popular in northern China in the last few years. The exact efficiency of this practice is uncertain, some say it leads to a substantial production increase and others say it is a fancy gimmick. While the value of this agricultural technique is still unsettled, Hubei and Jiangsu went ahead and developed a high clearance tractor for this planting method. It turned out that the peasants did not really have urgent needs for this product and there was no market interest. This examplesshows that we must be fairly certain about the production need before we settle on a research project. We should never just do what we please and hastily set out to do some project. Definite information on production need can only be obtained by careful survey and analysis.

Economic Benefit Analysis Must Be Conducted Before Deciding on a Project

The viability of a new product or new technique is determined by its economic benefit. This is particularly true in China where there is abundant labor. Why cannot the world renowned rice transplanter become popular in China after over 20 years? (Up to 1979, only 1 percent of the ricefields in China were machine planted.) Beside the mismatch between agricultural technique and agricultural machinery, the main reason is that its economic effect is not prominent. Conversely in the current sales decline of large and medium farm machinery, the most expensive crop combine harvester is actually increasing in sales. The reason is simple, its economic benefits caught the eyes of the peasants. The peasants are most pragmatic people, even though they do not have electronic computers to do precise computation, they can figure out the economic benefit just from their experience. A Dong Feng-5 automatic combine costs 30,000 yuan, a Beijing-2.5 automatic bombine costs 13,000 yuan. But the per mu field loss (of wheat) using harvest machine is 2.614 percent less than that of the manual reaping (actual measurement made in Yu County of Henan Province shows that the loss in manual reaping is 3.432 percent and the loss in machine reaping is 0.818). This means that by using harvesting machines the loss per mu is 12.904 jin less or 1.94 yuan less. The reduction in yard loss is generally 1 percent or more (4 percent if mold and mildew loss is taken into account), this is equivalent to 1.20 yuan. Because crops mature faster in summer, summer planting can be conducted in time and per mu yield of autumn crop can be increased by 40-100 jin, which is equivalent to 6 yuan.

Each mu can use 10 laborers less and save 8 yuan. In addition, the upgrading of the grain by machine harvesting is another source of income. With all these combined, the increase per mu is as much as 20 yuan. A combine can reap (and strip) 1,000 mu of crop per year and increases the value by approximately 20,000 yuan, roughly equal to the investment of purchasing the combine. This is why the peasants are enthusiastic about buying a combine even though the price is high.

Therefore, economic benefits may be analyzed carefully before any research project is determined. If the economic benefits are outstanding, the consumers will rush to it even if the product is not so advanced. Otherwise, no matter how advanced the product is, it is only "a pretty flower that bears no fruit."

Technologically, We Must Know Our Own Ability and the Degree of Difficulty of Our Goal

According to military tacticians, no battles will be lost if one knows one's own strength and that of the enemy. This applies to battlefields as well as other professional fields. Although scientific research has its intricacies, knowing your own strength and knowing our target are still of utmost importance. We have often seen past examples in applied research such as the research and development of agricultural machinery where people have failed to take this into account. A project may have expended substantial amount of funds in research, material and experimental production but later encountered a host of problems and became unsalvageable and ended up as a heap of junk. Most of the time such failures are because the responsible technical personnel did not know their own capability and the goal they were trying to accomplish. In scientific research, our own strength refers to how knowledgable we are about the subject matter, our business ability, our intelligence level, our work experience and experimental technique (including experimental production). The "enemy" refers to the object of the study including its degree of difficulty, its complexity, work volume and urgency, whether the project is original work or improvement, whether there are previous examples to draw from and whether reference data and information are adequate.

We stress the need to know ourselves and our target so that we will do things practically and within our power. We simply cannot pretend on matters of science. To "catch up and overtake [advanced foreign countries]" is an intention we should have, but we should not lose our head in striving to do so. We must begin at our own base and proceed sure footedly to contribute to the development of the national economy.

If we know our capability and our goal, we will be much more efficient in carrying out the research topic of our choice; on the other hand, if we aim too high and blindly try to catch up and overtake, then our efficiency will be much lower and we may even end up with nothing accomplished.

"Project Task Plan" Must Be Done Well

The "project task plan" of a research project is like the battle plan and deployment in military action, it includes objective requirements, situation analysis and conceived implementation. To the leadership and management department, "project task plan" is an important step to improve the survival rate of research results and should be examined carefully.

In general a "project task plan" should include justification (source) of topic selection, objective requirement, anticipated economic benefit, items of investigation and key technology, intended use, method, resources needed and phased progress plan. All of these are important contents in judging whether a certain project should be done and the first three items are especially important.

The evaluation is generally led by the research office and administered by technology management department and institute leadership at various levels. When necessary the project proposer may be allowed to submit a report and reply and the review is conducted collectively. In the review, projects divorced from production needs, projects with nebulous economic benefits and nonessential projects should be turned down at an early stage in order to avoid the kind of situation where manpower and money are already invested and it is a shame to stop but it is impossible to continue. It should be pointed out that some comrades have advocated the idea of letting technical personnel freely choose their topic of study. I feel that even free choice of research topics should have limitations and should meet certain requirements, we should not let people do what they please.

Sometimes one must refrain from doing certain things in order to accomplish a certain goal. Only by eliminating, "with regret," nonessential projects and projects that should not have been granted, can we keep our priorities straight and let the limited technical manpower, financial resources and material play their proper role and improve the survival rate of research results. Otherwise, with all the priorities mixed up, haste makes waste, and our intentions can never be realized. Not only desirable results cannot be obtained, but manpower, money and material will also be put into an unwinnable battle and cause unnecessary waste. In other words, we should concentrate our effort on priority subjects. To this some might say, Chen Jingrun is only one man, but did not he grab the precious pearl on the crown? That is true, but we cannot forget that in today's science some topics are not within the power of one unit, let alone one man. It takes concerted effort of the society to accomplish these projects.

Fitting the Project With the Right People

After a subject is decided upon, the first major order of business is to fit it with the proper choices of people. If a project is not equipped with the suitable people, it is like a seed thrown in the desert and it will never bear any fruit. There are two considerations in choosing the right people, one is making sure the job is interesting to the people and the other consideration is making sure the job uses the talent of the people. Even if a

person's level is not particularly high in the beginning, if he just loves to do something, he may eventually make some unexpected achievement. The performance of Nie Weiping [5119 5898 1627] in go the ping-pong skill of Guo Yuehua [6753 6460 5478], the discovery of a new star by Duan Yuanxing [3008 0337 2502] with naked eyes, the outstanding accomplishments of Chen Jingrun [7115 2529 3387] on "Goldbach conjecture" are all examples of people loving what they do. In science research the assignments should also be made according to the preference of the researcher. This can be done based on the information possessed by the leadership or the technical management department and it can also be done using "advertisement." Forcing technical staff by administrative order to work on assignments not interesting to them is not a wise approach. Matching the interest and talent of people with assignment is not really a trick, it should be the norm in making assignments. Of course, "good at something" is relative. A comrade may be unfamiliar with a certain job in the beginning and not at all good at it, but after a period of time, he may become very good at his work. But this is no reason to assign people to work beyond their ability, it only shows that job assignment should be as stable as possible. We should not ask a person to do one thing one day and something else the next day because it would make him good at neither and simply wastes his time. In addition to the considerations of interest, talent and stability, organization and activity abilities should also be taken into account in making assignments. We should particularly look for scientific foresight and imagination and the spirit of achievement and venture.

Technical Responsibility System Should Be Strictly Followed

The technical responsibility system is an important component in technical management. Why do some research units have numerous research topics and spend great sums of money without achieving very much contribution? An important reason is that their technical responsibility system is not working. In these units, after the topic is determined, the research group simply does what it pleases, if some results come up, everyone is happy, if the research runs into problems and wastes time and energy, nobody is responsible. If this condition is not changed, there will not be many results and the survival rate of the results cannot be high.

In the socialist construction, there should be a clear-cut reward and punishment in any line of work, including science research. To have a clear-cut reward and punishment, the system must be specific. Technical personnel who work hard, achieve more results and contribute more to science research should be rewarded and those who loaf on the job, produce no results in years and cause much waste should be punished. The system should not just apply to the technical staff doing a specific job, that would not be fair, it should also apply to various technical officials as well. This calls for a strict technical responsibility system. The system should clearly spell out the responsibilities of members of a subject group and various level technical responsible officials in different jobs such as scientific research, design, experimental production, testing, evaluation and production. The method of punishment may include transfer away from scientific research posts and for serious waste offenders it may even investigate the economic responsibility of the

principal responsible official. Only then, the sense of duty of technical staff at all levels will be strengthened.

Avoid Hasty Appraisals

When a project is close to completion there should be an appraisal. Approval in the appraisal indicates the technical affirmation and recognition by experts in the field and by the responsible unit. But we should never be too impatient to wait for the results and should never conduct appraisals hastily, especially appraisal of products. As the saying goes: "Melons that are twisted off do not taste sweet." When a project still has not matured and appraisal is conducted to rush the result, all you get is a "bitter melon," which cannot be used in production and does not give the researcher a feeling of accomplishment and relief. For example, 25 of the 160 new agricultural machinery products (research results) were rushed to completion and entered appraisal with unresolved problems (these are the rice paddy harrow, transplant puller, multipurpose seeder, and standing corn harvester). These new products (research results) were actually not ready and their performances were poor but in the anxious rush for results they were appraised and the models were set with the hope that further improvement would be made in mass production. This innocent wish in fact was the cause for failure. This kind of practice has many disadvantages and should be avoided.

From past experience, research result appraisal should not be conducted in public. Research results should be appraised with science and it is best done by authoritative research organizations. The scientific technical test report is the result evaluation and whether the result should be put into production is based on the evaluation.

In summary, improving the survival rate of research results is a major endeavor that affects production increase, conservation, waste reduction, and makes scientific research serve the national economy more effectively. We hope it will receive the attention of various leaders, experts, and the mass workers in science and technology. The author believes that, as long as we can do a good job in the seven areas described above, the survival rate of research results will be derived from the huge manpower and financial and material resources put into scientific research by the state.

CSO: 4008/106

YUNNAN BUREAU OF SUPPLIES ISSUES CIRCULAR ON PRICE CONTROL

Kunming YUNNAN WUZI SHICHANG in Chinese 16 May 82 p 1

[Article by Li [7765]: "Provincial Bureau of Supplies Issues Circular on Strengthening Commodity Price Control"]

[Text] On the basis of the spirit of the State Council's "Circular on Firmly Stabilizing Market Commodity Prices" and of the "Opinion on Comprehensive Regulation of Market Commodity Prices" issued by the Provincial Commodity Price Committee after approval by the Provincial People's Government and in consideration of the actual conditions in the supply departments, the Provincial Bureau of Supplies most recently issued a "Supplementary Circular on Strengthening Commodity Price Control" as Document No 93 of the 82d Yunnan Supplies and Finance Service. The circular stipulates the following:

1. The supply departments at all levels must organize supply of materials strictly on the basis of division of work and of the scope of business. They must not resell the assigned quotas and engage in illegal resale at a profit.

2. "Shi Hua Yi Tiao" [0934 0108 0001 6148]. Service fees for rental of supplies must be applied strictly on the basis of the stipulated standards and cannot be raised.

3. In order to realistically stabilize commodity prices, the general price checkup work concerning various supplies purchased and sold must be strengthened. Regardless of how many links in commodity circulation a given material has to go through, the management expenses and stocking fees to cover the costs incurred in the process of the allocation of supplies can be collected only once on the basis of the original price of the material and in accordance with the normal form of an unimpeded commodity flow. Neither to collect any additional fee at each link nor to raise price by merging the stocking fees into the original price is allowed. No fee shall be collected for the supplies not been subjected to the procedure of settling accounts by a supply department.

4. All state-planned supplies deemed to be indispensable due to production [illegible] shall be sold at an ex-factory price approved by a supply department [illegible] county level. The price is not allowed to be driven up.

5. [illegible] should make a conscientious review of existing fee collection [illegible] of examination and approval by a supply department has not been

carried out, a supplementary examination and approval procedure must be followed.

n. In the cases of supplies for which there is overlapping management, the joint-managed units must be in compliance with the price used by the main unit.

[illegible]
CSO: 4006/475

FOREIGN TRADE

REVENUE FROM PROCESSING WITH CUSTOMERS' MATERIALS INCREASES

Guangzhou NANGCHENG WANBAO in Chinese 26 May 82 p 1

[Article: "Income From Processing Outside Materials in Dongguan Highest of All Provinces; Last Year's Income Was Over $26 Million and There Has Been New Expansion This Year"]

[Text] Last year, enterprises in the cities and towns and commune teams of Dongguan County received materials from Hong Kong businessmen for processing and earned processing wages of over $26 million, the highest income of all our provinces. When this amount of foreign exchange is calculated in Renminbi, it is equivalent to the total income for food manufacture for the county as a whole. Calculated on the basis of the total population of the county of 1.6 million persons, it amounts to an average of 67 yuan per person. During the first 4 months of the year, there has been a new expansion in processing of outside materials.

During the past 2 years, the leaders, cities and towns and commune teams of Dongguan County have devoted their efforts to expanding facilities for processing of outside materials in the course of expanding foreign economic activities. In 1979, during the season in which the lichee matured, concerned departments at all levels of the county, communes and teams invited Hong Kong businessmen and fellow townsmen from abroad to come for visits. They showed them the state of construction in their native towns and also discussed processing of outside materials. The county government concentrated on establishing an office for processing and assembling of outside materials and assumed responsibility for study and approval of agreements and for business guidance. The procedures whereby Hong Kong merchants could return and discuss business were comparatively simple. All that was necessary was for both parties to discuss suitable conditions and, especially, in half a day it is possible to complete an agreement as compared to the procedures of study and approval. More than 1,200 agreements on processing of outside materials have been signed over the past 2 years. Last year, income from processing increased by 46 percent as compared to the previous year and was 11 times greater than in 1979.

Development of processing of outside materials in Dongguan County has led to the following advantages of improving employment, introduction of technological equipment, promotion of expansion of industrial and agricultural production and improvement of the standard of living of the people. First, more than 50,000 persons found employment. During the readjustment of the national economy,

[illegible] more than 90 "extinct" plants and companies in the county as a [illegible] did not have production assignments or that had severely inadequate [illegible] assignments. After processing of outside materials was instituted, [illegible] have full assignments and loss has been turned into profit. Next, we introduced large quantities of imported equipment and we have trained a [illegible] force. Throughout the province as a whole, $16.68 million worth of equipment for processing outside materials was introduced. In somewhat over 2 years, we have used a portion of the fees from processing of outside materials to [illegible] more than $6 million, with a great deal of the equipment now being owned by the plants and companies. Third, we have used the income from processing of outside materials to obtain locally retained foreign exchange. In addition to importing 42 trucks of various sizes and production facilities, we also imported 750 tons of urea, 12 tons of agricultural chemicals and more than 5,000 packets of concentrated foods such as fish meal. This has stimulated expansion of industrial and agricultural production. Fourth, the incomes of commune members have generally been increased as the result of expansion of processing of outside materials by communes and teams. At present, each of the 54 communes in the county as a whole has undertaken processing of outside materials for Hong Kong businesses. Last year, the income for processing of outside materials in 9 of these communes exceeded $1 million.

[illegible]
CSO: [illegible]/8

FOREIGN TRADE

POLICIES FOR EXPANSION OF PROCESSING FOREIGN MATERIALS VIEWED

Fuzhou FUJIAN RIBAO in Chinese 8 May 82 p 1

[Interview with Wang Yan, provincial vice governor, by FUJIAN RIBAO reporter: "Attacking Criminal Activities in the Economic Sphere Is Beneficial for Expansion of Processing of Foreign Materials"; date and place not specified]

[Text] Wang Yan [3769 3508], vice governor of the Fujian People's Government, has most recently gone into the question of further expanding processing and assembling of foreign goods and answered questions raised by the reporter.

Question: Please tell us what the present circumstances are in respect to processing and assembling foreign goods?

Answer: In this province, we have implemented specific policies which we have been carrying out flexibly for over two years. There has been a fairly great expansion of processing and assembling foreign materials. At present, we have developed businesses of this kind with overseas Chinese merchants and foreign merchants from more than twenty countries and regions such as Hong Kong, Macao, Singapore, Thailand, Japan, Italy and the United States. There are more than 80 types of products made by processing and assembling foreign materials including various kinds of clothing, knitted and hand-woven sweaters, plastic goods, metal machinery, electronic components and handicraft goods. The quantity has increased from year to year. In 1981, the number of agreements signed increased by 104 percent as compared to 1980, the amount of money involved increased by 140 percent and wages actually received increased 66 percent. In the first quarter of this year, the number of agreements increased by more than twice that for the same period last year, the amount of money involved three and one-half times and wages actually received increased by 78 percent. Practice demonstrates that processing and assembling foreign materials can be carried out easily, that it is beneficial to both parties and that it is a good way of expanding foreign economic activity.

Question: Will the present attack on the serious criminal activities in the economic sphere affect expansion of processing and assembling of foreign materials?

[illegible] will definitely not have any effect. There hasn't been any change in [illegible] handle domestic economic policy and there has been no change in our [illegible] opening up foreign trade. There has been no change in our implementation [illegible] and in our policy of fexible implementation and there has been [illegible] change in our policy of trial operation of special economic zones. Further [illegible] to foreign trade is something about which we will be unwavering and is [illegible] separate matter from the attack on the serious criminal activities in [illegible] sphere. Such serious criminal activities as smuggling and private [illegible], corruption involving accepting bribes and speculation and swindling are already damaging the reputation of our Party and nation, undermining [illegible] construction and impeding normal foreign economic activity. They are also very disadvantageous for overseas Chinese merchants and foreign merchants. Therefore, I'd say that attacking serious criminal activities in the economic [illegible] is something that is essential if we are to correctly implement our policy of opening up to foreign trade and handle our domestic economic policy. Not only will not have any effect but it may also stimulate healthy expansion of [illegible] and assembling of foreign materials. It may also hinder cheating and swindling of overseas Chinese merchants and foreign merchants of a few lawless [illegible]. It should be said that all we ask is that they be proper. Enterprises [illegible] processing and assembling outside materials that do not engage in smuggling and private peddling, speculation and reselling at profit, swindling, giving and taking bribes and tax evasion will all be actively supported and encouraged. We [illegible] wholeheartedly welcome all overseas Chinese merchants, foreign merchants and [illegible] from the industrial and commercial sectors of Taiwan Province to come to [illegible] province and engage in processing and assembling of foreign materials. We will guarantee their legal rights and interests and proper profits in accordance [illegible] with law.

[illegible] What are the prospects of expanding processing and assembly enterprises for foreign materials?

[illegible] I believe that the prospects for expansion are extremely broad. In this province, we not only have a special policy of vigorous implementation of the [illegible] conditions but we are also adjacent to Hong Kong and Aomen where there are more than 5 million overseas Chinese. There is an abundant labor force, [illegible] superior natural conditions and there is a stable social order. In addition communications and telegraphic connections with the outside are becoming more and more convenient and building of the Xiamen Special Economic Region is being hastened. It can be said that we have the conditions and capacity whereby overseas Chinese businessmen and foreign businessmen can engage in processing and assembling of foreign materials. It is my belief that if leaders at all levels free themselves of old ideas, take action and make full utilization of these advantageous conditions, there will be a continual expansion of enterprises for processing and assembling foreign material in our province and we will make even greater accomplishments.

[illegible] What kinds of enterprises can engage in processing and assembling of foreign materials?

[illegible] All enterprises for which the [illegible] Administration of Industry [illegible] has approved a license for opening a joint enterprise can do so as long

[illegible] meet the conditions of production and technology required for processing and assembling products from foreign materials. It does not matter whether they are along the [illegible], in mountainous regions, in a large city or in a small town, whether they are state-owned or collective enterprises or whether they are [illegible]. Neither does it matter whether they produce in large or small quantities.

[illegible] What [illegible] should attention be directed at present in expanding processing and assembling of foreign materials?

As we [illegible] say, affairs should be handled in accordance with the relevant laws and policy stipulations of the national and provincial governments. Particular attention should be given to keeping to expansion of production of export goods and earning foreign exchange income as major objectives. We must deal correctly with [illegible] processing and assembling foreign materials with export trade. [illegible] We must devote a great deal of effort to developing production techniques that will be beneficial in increasing export products, to improving the quality and variety of products and to increasing products with competitive quality. We must protect and encourage normal foreign economic activity, and we must punish by legal means those who make use of processing and assembling [illegible] materials to engage in smuggling and private peddling, [illegible] collection and fraudulent collection, tax evasion and speculation and [illegible] of profit.

[illegible]

IMPORT OF DURABLE CONSUMER GOODS RESTRICTED

Guangzhou GUANGZHOU RIBAO in Chinese 20 May 82 p 4

[Article by Zhou Zhiping [0719 3112 1627]: "Strict Limits Should be Placed on Import of Durable Consumer Goods"]

[Text] The state has stipulated restrictions on the import of eleven types of durable consumer goods, i.e., automobiles, television sets, wristwatches, bicycles, tape recorders, cameras, electric refrigerators, radios, electric fans and washing machines. This has been done entirely with a view to the long-term interests of the state and of the people and has been supported and approved of by the broad masses. Nevertheless, there are those who still have doubts: Is limiting imports consistent with the policy of opening up to the outside world? We believe that there is no contradiction in this. The reasons are as follows.

First, we are maintaining our policy of opening up to the outside whereby we introduce foreign capital, introduce new technology and import new equipment that we are not yet able to manufacture domestically. The purposes of doing this are so that we can study the strong points of other countries, develop our own national economy and promote the development of our own industries. Limiting import of durable consumer goods is also for the purpose of protecting and developing our national industries. Thus, the two objectives are completely consistent with each other. We should note that any country in the world must protect and expand its own national industries for its own national interest. Even though foreign trade is an indispenable element forming the economic foundation of capitalist countries most of them adopted protective tariff policies during the early years of their development in order to safeguard the interests of the capitalist class. On the one hand, they used high tariffs to limit or prohibit import of foreign industrial products while they also restricted or prohibited export of raw materials required by the nation's industries. From another side, they used such methods as low tariffs and export subsidies to encourage export of the nation's industrial products and to increase the competitive capacity of the nation's industrial products in the international market. Capitalist countries do not adopt free trade policies until capitalism has developed to a considerable extent and their industrial products have secured a firm footing in the international market. Even though this is the case, at the present time capitalist countries still adopt various measures to protect, support and stimulate the interests of the

nations's industries and the development of capitalist industries. Our country is a socialist nation and we should strive to develop our own national industries with a view toward our long-term interests. Imports of durable consumer goods are used directly in consumption. Our domestic industries that produce this type of product are at the moment in a developing stage. If we do not impose restrictions on large-scale import of foreign products, they will inevitably strike the domestic market amd will be very disadvantageous to the development of our national industries. At present, there are a number of units that are using reserve foreign exchange for large scale import of durable consumer goods, after which they take them outside their own areas and sell them at high prices. This is essentially buying and selling for speculative profit and engaging in commercial speculation, the effects of which are even worse.

Second, strict limitation of import of durable consumer goods can make foreign exchange available for use in introducing needed technological facilities and developing our own new industries. In this way, we allow limited foreign exchange to play an even large part in socialist construction. At present, there is a shortage of foreign exchange and there is similarly a question of benefits involved in how to use it correctly. If we use the foreign exchange for buying materials for everday consumption to purchase the technical equipment and key equipment required to develop our own new industries and the technological data needed in research that we cannot yet solve ourselves, this is no different from taking the money for "buying eggs to eat" and using it to "buy a chicken to lay eggs." This is obviously more advantageous. For example, up to October of last year, we imported more than 16 thousand vehicles. The money that was spent on them amounted to more than four times the amount invested by the state over the years in the Shanghai Automobile Plant. If we stop importing automobiles and use the province's foreign exchange we can replace and renovate the technical facilities in our domestic automobile industry. This will serve to expand our own automobile industry. As another example, in 1980, the Ministry of Commerce took a portion of foreign exchange that had been withdrawn from circulation for importing wristwatches and used it to import 120 key pieces of equipment in manufacturing wristwatches. As the result, the Shanghai Clock and Watch Company increased watch production to close to 1 million watches. By contrast, blind importing of foreign electronic watches in large quantities not only led to overstocking of domestivally produced wristwatches and affected conversion to domestic production of electronic wristwatches but even led to overstocking of imported wristwatches, with foreign exchange have been exclusively used and wasted.

Third, limiting import of durable consumer goods and encouraging use of China-made goods is beneficial in establishing and increasing a sense of pride in using China-made products among the people and in sweeping away a social mood of blind faith in foreign goods. In the over 30 years since the liberation, our nation's industries have acquired a considerable foundation. In recent years, there has been a rapid development of new industrial sectors including household electrical appliances and durable consumer goods, with domestically produced goods coming to find more and more favor among the broad masses of people. However, it should also be noted that some people still have a spirit of blind seeking after imported goods. There is no need for reticence. There are still some domestically

produced durable consumer goods the quality of which is not completely up to standard. For this reason, we must learn the views of consumers on a broad scale within the country in order to make improvements. If no one likes using something, where to we begin to improve product quality? And yet, we have many well-known brands of products with superior quality that have acquired a very good reputation in the international market. However, in importing products, such phenomena as substandard goods, products with false brand names and adulterated products are common occurrences. We must never underestimate our own capabilities.

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